Telephone Engineer

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EDITORIAL

Stop These One-Sided Stories

In a few localities telephone men have a big job of putting newspaper editors on the "right track" regarding operations of public utilities.

Some newspaper editorial writers have about as much vision and analyzing power as a "kid in knee pants."

The Madison, Wisconsin Times recently published an editorial, which clearly shows that the author did not sit down and analyze his subject matter before splattering his columns with some mighty shallow remarks.

In reviewing Aldous Huxley's book, "Brave New

World," he tells how Mr. Huxley "envisions a propaganda ruled society of men in which people are divided into distinct classes, designated by the Greek letters Alpha, Beta, Delta, etc., and each class taught from birth the propaganda that its lot in life was the best possible. Each class would have certain tasks assigned to it and each would be taught to do his work and live his life as mechanically and emotionlessly as a robot."

Then the writer starts in to discuss at length his chosen subject, "Making Robots of Madison Telephone Employees." He says:

"So much for Mr. Huxley's 'new world,' which he describes somewhat facetiously. But Mr. Huxley has nothing on the big utility interests when it comes to the uses of propaganda. Take the Wisconsin Telephone company, the A. T. and T. subsidiary which spreads itself over much of Wisconsin. The Wisconsin Telephone company has never hesitated to use its employes for political purposes nor has it ever missed the opportunity to pump its workers full of utility propaganda.

"Recently here in Madison the local exchange held a visitors' day. There was the likelihood that the telephone users visiting the exchange might ask questions about rates and about the astounding revelations made by the telephone hearings held in Milwaukee by the Public Service commission,—for instance, that thousands of dollars of telephone money had been paid out by the company to buy golf club memberships and to pay dues and expenses of high telephone officials. The Wisconsin Telephone company didn't want the public to find its employes unprepared with ready answers, nor did it want the employes to do any independent thinking of their own.

"So,—the mimeographs began to grind out hundreds of prepared statements in question and answer form which were distributed to employes. These propaganda sheets bore as their heading: "This material prepared for use by employes at visiting days or elsewhere to meet questions such as 'Why don't you reduce your rates'?" In answer to the query, "What about this investigation?" the telephone company employe is supposed to say, among other things: "I am sure my company, when given the opportunity, will satisfy everyone its rates, policies, and practices are not only all right but in the public interest . . . I know if it were possible to reduce telephone rates my company would reduce them voluntarily because it would be good business to do so and it would be in accordance with our established policy. . . . It is more important, I think, to help one another through this period of depression than to carry on expensive investigations that serve no useful purpose."

"We are informed that the telephone company here spent two weeks prior to the visitors' day instructing its employes how to answer questions the public might ask about the rate investigation. Special employe meetings were held where telephone officials told how wrong the papers and the Public Service commission had been in giving the telephone company "unfair publicity." The visitors' day was part of the company's propaganda scheme to cover up the revelations of telephone company practices made by the Public Service commission. This was evident from the numerous charts displayed on visitors' day showing telephone taxes paid, etc., all blackened up to look impressive.

"The employes' question and answer propaganda sheet said, "It is more important to help one another through this period of depression than to carry on expensive investigations," didn't it? Well, what is the "help one another" record of the telephone company? It is reported that the American Telephone and Telegraph company, the parent company, has laid off 30,000 men in the last three months and that the Wisconsin Telephone company itself has discharged 300 employes in Wisconsin since March 1. The Madison exchange is said to have laid off 23,—just completed this cut a month ago,—and another cut is reported as due in June. "Help one another," did they say?"

We would like to point out to this writer that every day he is besieged by salesmen that have been trained in sales arguments for the products they sell and the companies they represent. They too get mimeographed sheets from their headquarters, giving them all the facts and figures about their products and companies, which they use to sell the public.

We would like to ask this editorial writer if he has condemned the average salesman's arguments as propaganda and flay him for using it and his company for furnishing it. We'd bet our last dollar that he never has. And—it is safe to say that arguments given the Wisconsin Telephone employees are no more exaggerated than those used by the average salesmen.

Probably if this man delved down into his newspaper and other newspapers he would find that their advertising salesmen use plenty of arguments furnished by the advertising chiefs, and which could be classed as propaganda on the same basis as the arguments of utility employees. Where does he think newspaper advertising salesmen get their arguments? We are sure we would be safe in saying that most of it is "ground out" by the advertising executives of the paper.

Still another point needs to be refuted. He talks of the Wisconsin Telephone company and the A. T. & T. discharging employees today.

If he had conducted a survey before he put his thoughts into print he would have found that public utilities as a whole have kept a greater percentage of their employees on the payroll during the past three years of depression than any other one industry. We challenge this editorial writer to refute this statement. Is it any wonder that public utili-

EXPECT BIG ATTENDANCE AT CONVENTION

THE ANNUAL Convention of the United States Independent Telephone Association which will be held July 11, 12, 13 and 14, in the Tower Room, Stevens Hotel, Chicago, as always will be an important event of the year as far as telephone companies of the Independent side of the industry are concerned.

At that time telephone men from every state of the Union will meet to discuss and solve the present problems that are facing the telephone industry today.

Although state and district telephone meetings have a far reaching effect in the telephone field, there are many problems of national scope that extend beyond state and district boundaries. These problems naturally come before the National Association, and in order to keep in touch with them, telephone companies must associate themselves with it as well as state and local associations.

While the Association keeps its numbers informed of these matters by circulars and reports, it is at the general meeting that the individual member has the opportunity of expressing his own ideas and of hearing others express their views.

Not only does the convention give this opportunity of hearing the exchange of views, but it provides the opportunity of keeping in touch with the developments of the art. Manufacturers and suppliers of telephone equipment will be present to give visitors information on the latest and up-to-date equipment and telephone improvements.

According to reports the convention this year will be well attended, not only by the larger telephone operating companies but by a more liberal representation from smaller companies.

Many telephone men are planning to attend the convention and the World's Fair at the same time. The convention program has been arranged so that the afternoons and evenings will be free for visitors to attend the Fair.

The Bell System has an exhibit at A Century of Progress that will be interesting to all telephone men. So far, this display has been one of the most popular in the entire Fair grounds.

Reduced round trip railway fares for the World's Fair should be an added inducement for telephone men to come to Chicago and attend their Association's convention.

A well-planned and interesting program will be presented. The program follows:

OPENING SESSION

July 11—10 A. M.

Report of Secretary Chas C. Deering:
Special Discussion "Credit on Insurance for Telephone."

Report of General Attorney Alfred L. Geiger:
"The Securities Act."
"New Taxes on Dividends and Capital Stock."
"Proposals to Prevent Appeals to Federal Courts from State Commission Decisions."

Report of President F. B. MacKinnon:
"The National Recovery Act as Applied to Telephone Companies."
"The Status of the Depreciation Order."
"The Revised Recounting System."
"Conditions of the Industry."

Appointment of Committees.

General Business.

GENERAL SESSION

July 12—10 A. M.

Address, "A Group Plan for Annuities for Independent Telephone Em-

(*Continued on page 26*)

ties funds are running low and that they must reduce their payroll?

Newspapers editorials have done and are doing a great deal of good but some times their authors go off on a pet tangent, many times for no other reasons than to get circulation and support. In other words, they spread quite a lot of propaganda, resulting from lack of study and research into their subjects.

Telephone men must refute this type of statements. They must go direct to the newspaper editors and personally and frankly discuss the operations of public utilities and to show them that many times they present one-sided stories.

We Make No Apologies We make no apologies to our readers for the consistent "Buy Now" campaign which has been carried on in the editorial and news columns of TELEPHONE ENGINEER.

The campaign has been conducted for two reasons; first, to help telephone operating companies and second, to aid telephone manufacturers and suppliers.

We have continually urged telephone companies to buy needed equipment while prices of equipment and labor were low in order to affect every saving possible.

Realizing that managers of many small operating companies are not in a position to keep in touch with daily market reports we have, from time to time, given them facts and figures to show them that commodity prices were increasing and pointed out that these increases materially affect prices of telephone equipment and supplies.

We also realized that manufacturers and suppliers needed all the business they could get to continue their valuable research, engineering and development work, which has been and is so vital to operating companies. By urging telephone companies to "buy now" we were helping the manufacturers and indirectly the operators.

At no time have we tried to influence telephone companies to make unnecessary purchases and we are confident that our good readers have not resented our sincere efforts along this line. We have endeavored to serve them and the entire industry and for this, our duty, we make no apologies.

SERVICE TESTS IN MAGNETO EXCHANGES

Meeting Changing Conditions Economically — The Necessity for a Definite Standard and Policy for Local Battery Service — Practical Testing Methods.

By
T. DeWITT TALMAGE
Transmission Engineer

IT IS gratifying to observe that in spite of materially decreased income and the resulting scaling down of expenditures, telephone companies are religiously maintaining a high grade of service; a quality of service that, in most cases, is equal to that which was furnished in more prosperous years.

"Good service" is a much used term. It is unfortunate that it is used so much that we seldom stop to think about its meaning. There are some telephone men, who, when evaluating or grading telephone service, have a tendency to think chiefly in terms of the speed with which the operators answer the customers' calls. Such a view, of course, is not all-inclusive enough to be a true standard of even an accurate guide of our service. Where such an attitude exists, there is danger that the training of the traffic employees will be over-emphasized.

Much effort has been directed toward improving central office equipment, especially operators' telephone sets and the source of current for their transmitters, to a point where the trained, vibrant, courteous tone of voice of the operators is not distorted and made unnatural.

Test Sample Service

This is a step in the right direction, but the requirements of satisfying telephone service cannot be described by limiting the discussion to central office equipment and operating routines. These two things mean little if the customers cannot talk in an easy and natural manner over the established connection.

There are other factors besides the volume efficiency of circuits that affect the satisfactoriness of the connection which the customer gets, the losses, for example, due to the distortion of the complex voice waves in circuits connecting central offices, the noisiness of the room or other place in which the telephone instrument is located, and the amount of so-called "side tone" which is heard in the subscriber's receiver as a result of the operation of his own transmitter.

Therefore, one of the essential activities of every telephone organization is to make sampling tests of the quality of service being rendered to the public, so that it may definitely be known how close the efficiency of each exchange area approaches the standard considered necessary. Such a testing program reveals the surprising and disconcerting weaknesses as well as the satisfying and gratifying parts of the company's service.

Aimless work, however diligent, will not produce the results that are possible through a well-defined plan of action and a standard by which to gauge every effort and result. One important indication of the grade of service being furnished to a community is the number of troubles reported and the promptness with which they are cleared.

Modern Standards Need

Loss of telephones has made the service of less value to the remaining subscribers. Some companies are making strenuous efforts to increase the attractiveness of their service to offset this reduced value resulting from the decreased number of subscribers. Every possible effort should be made to give more and better service to those remaining customers in lieu of a lower rate.

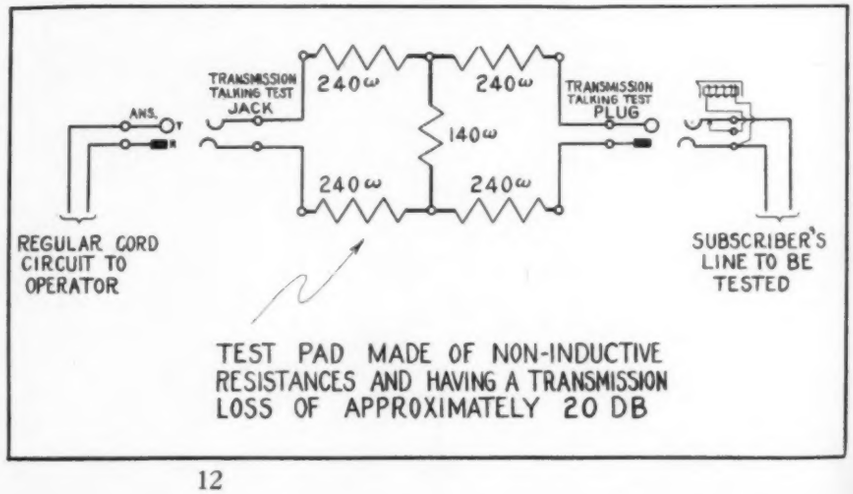
One of the most successful ways to put a company on a good footing with its subscribers is to work out an economical and effective testing and maintenance program that is planned to find and clear troubles before they are detected by the customer or the operator.

Make Talking Test

Fortunately, a program of systematically testing the overall performance of a customer's line and instrument is extremely simple, and the necessary testing equipment may be secured for a nominal sum. Among other advantages, such a routine will result in putting to good use some of the idle time of employees.

Two of the most prevalent causes of mediocre service in magneto exchange areas are inefficient transmitters and worn-out dry cell batteries. It is to be regretted that some of the smaller companies, in their efforts to economize, are using exhausted dry cells to such an extent that a commercial grade of service is being jeopardized. On the other hand, there are companies reporting real progress in carrying on their program of reducing trouble reports initiated by subscribers and operators who have encountered poor transmission volume or quality which later has been traced down to worn-out dry cells at the customer's station.

Fig. 1. A Simple Testing Circuit Which Is Used As a Standard for a Satisfactory Grade of Service on Magneto Subscribers' Lines.



One of the most practical methods of discovering serious transmission losses in the overall transmission of customers' lines and stations is to make a "transmission talking test" over the line. The test circuit used contains a network of resistances or test pad causing a fixed transmission loss.

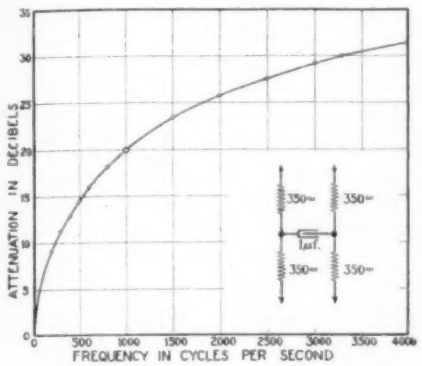


Fig. 2. Curve Showing Distortion Effect of Artificial Line Measured Between Impedances of 600 Ohms Each.

The principal part of a desirable program of testing and renewing worn-out dry cells before the customer's service is impaired, is the consistent use of a test pad such as shown in Fig. 1. This pad may be secured from the manufacturers of telephone equipment. The American Automatic Electric Sales company, makes an inexpensive test pad assembled in a metal case containing installing and operating instructions.

In offices that do not have a test desk, the test pad may be mounted either in the rear of the switchboard or on the distributing frame.

One type of pad used for making talking tests is shown schematically in the lower right-hand corner of Fig. 2. Due to the electrical characteristics of this particular test pad, different frequencies are transmitted with different efficiencies, that is, the different frequencies within the voice range are attenuated or weakened unequally, as shown by the attenuation—frequency curve in Fig. 2. Distortion impairs the quality of a telephone conversation.

Service Test Procedure

The test pad recommended for use in magneto exchange areas is made entirely of non-inductive resistances and causes no distortion. In other words, all frequencies are transmitted through it with equal efficiency. An attenuation—frequency curve of such a test pad would be a straight line parallel with the axis of the abscissas or horizontal base line, and located at a height indicating the proper transmission loss. Any distortion that is noted when making transmission talking tests with a pad of this type, will be caused by the lines or equipment under test.

The installer or repairman calls in and requests the operator to make the test with him. The operator inserts the transmission talking test plug, shown on the right in Fig. 1, in the line to be tested and inserts a regular answering cord into the transmission talking test jack, shown on the left side of Fig. 1. The performance of the line is considered satisfactory if a conversation can be readily carried on in a normal tone of voice for one-half minute or so over the test circuit.

It is assumed, of course, in using the testing circuit in Fig 1, that the transmitting and receiving losses of the operators' telephone sets are comparable to those of the standard test desk. Likewise, the transmission loss of the cord circuit over which the operator talks should be of a reasonable value.

Where the test is made by experienced traffic employees during non-busy hours, using a standard operator's telephone set with the customer himself using his own instrument, the operator calls the subscriber and engages him in conversation for 30 seconds or more, asking him questions regarding the service or other matters that require an answer by the customer. One of the usual questions is, "Do you have any trouble making other poople hear you?"

Company on Its Toes

During the test the operator will note whether there is any decrease in the volume of transmission toward the end of the conversation. If the transmission is satisfactory the operator should say, "Thank you. That is all. We are just testing your telephone."

However, if there is a perceptible decrease in volume toward the end of the half-minute period, the operator should continue the conversation for a slightly longer time to be certain that the falling off in volume is due to low battery supply rather than some change in the subscriber's position in relation to the transmitter mouthpiece.

If the operator has difficulty in hearing the subscriber, the first question to ask is, "Are you talking close to your mouthpiece?" If he is and his voice is still faint or "distant," thank the subscriber and inform him that there seems to be some trouble with his telephone and that you will have it taken care of.

It is well to remove the test pad from the talking circuit when informing the customer that the trouble will be taken care of, in order that he will have no difficulty in hearing and learning that the company is on its toes and determined to give him the best of telephone service.

The daily results of the transmission talking tests are turned over to the manager or repairman for his attention. The actual locating and clearing of the faults causing the trouble are accomplished by means of the usual trouble clearing routines.

Test Rural Stations, Too

In order to reduce the expense of trouble visits out into the rural territory, it is well to test all rural telephones in the same general locality at the same time so that all trouble may be charted within this entire district. This gives a complete picture of the repair work necessary in this area, and permits planning the most economical solution.

Where battery replacements are indicated in telephones located at a considerable distance from the exchange, it may be possible to secure the customer's

Fig. 3. Watch-Sized Battery Gauge Used For Testing Service Life of Telephone Dry Cells.

consent to receive the new dry cells by mail. Some economies will result from the practice of letting the subscriber place and connect the battery. Where this routine is followed, the

(*Continued on page 23*)

LIGHTNING--EFFECT ON PHONE SERVICE

By
HOWARD S. WARREN
Protection Development Engineer
American Tel. & Tel. Co.

EDITOR'S NOTE: *Storms and storm damage have been frequently described but always from the standpoint of the emergency created and of the accomplishments of the telephone forces in restoring the service for public use. The following article discusses storms and storm phenomena from another point of view, that of cause instead of effect. Though necessarily technical in character, it will be of interest to non-technical readers as evidence of the continuing study of storms and their effect on telephone service.*

BECAUSE of its magnificence and grandeur, lightning with its sudden and uncontrollable outbursts of power has always been an object of admiration as well as awe. No wonder that in the ancient days, when the gods were associated with visible objects such as land, sea, trees, and the heavenly bodies, lightning was supposed to be the special weapon of mighty Jove himself. Even up to modern times, lightning was widely regarded as a sign of divine displeasure and attempts to escape its baneful effects were decreed sacrilegious.

While lightning is no longer regarded as anything but a natural phenomenon governed by the immutable laws of physics, still because it is mysterious in character and unique in aspect while yet directly related to our daily life, lightning is a subject of widespread interest and even curiosity. To telephone people lightning presents a practical problem, for it is capable of producing serious effects on communication service, either by damaging overhead lines and their connected equipment or by disturbing the transmitted signals.

Lightning occurs all over the world, both on land and sea, but its distribution is very non-uniform. In the United States some regions have a hundred time as many thunder storms as others, the area of most frequent occurrence centering around northwestern Florida where there are on the average about ninety thunder storms per year. Severe lightning is also experienced in the northern New Mexico and southern Colorado area where the average number of thunder storms per year is about seventy. In the vicinity of New York City the yearly average is about thirty, while around San Francisco it is only one. Lightning is much more severe in some thunder storms than in others, but nothing indicates that on the average the storms occuring in different localities differ much in severity.

Development of Protection

If Benjamin Franklin had never done anything else, he would have immortalized his name by his famous kite experiment of July 4, 1752, by which he showed that lightning is electrical in character. At that time electricity was known only in its static form, it being forty-four years later when electric current was first produced from batteries and seventy-nine years later when the principles underlying the production of currents from inductive mechanisms were experimentally demonstrated.

Up to the latter part of the nineteenth century investigations in this field were concerned chiefly with the problem of protecting buildings by lightning rods according to the method proposed by Franklin. Since that time lightning investigations have been largely from the standpoint of developing protection for electric power and communication systems. The storage in large qcantities of oil, gas, and explosives has also brought about special and difficult problems in lightning protection.

Lightning studies in recent years have made use of a number of devices and methods unknown to earlier investigators. One such instance is the simulation of actual lighting by controlled electric discharges at from one million to ten million volts. In the laboratory this method has yielded valuable information about the formation and behavior of long arcs in air. It has also been employed for test purposes on high voltage transmission lines. However, as the controlled discharges are necessarily on a reduced dimensional scale, care has to be exercised in applying the results to natural lightning conditions.

An instrument called the "klydonograph" has been extensively used, be-

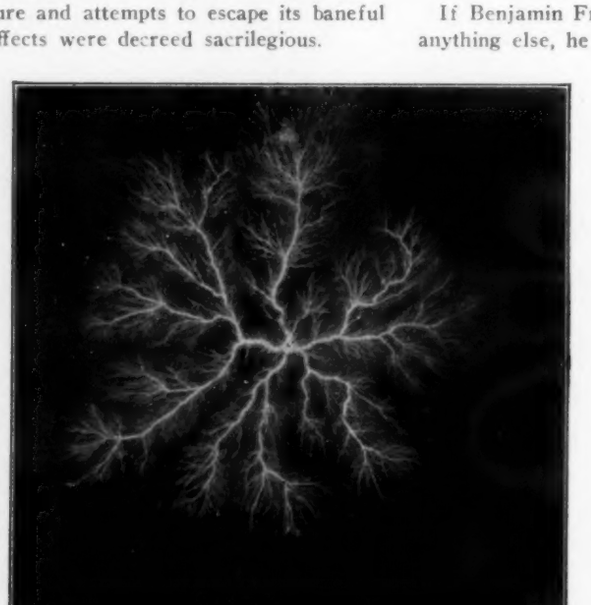


Fig. 1. Positive Klydonograph Figure.

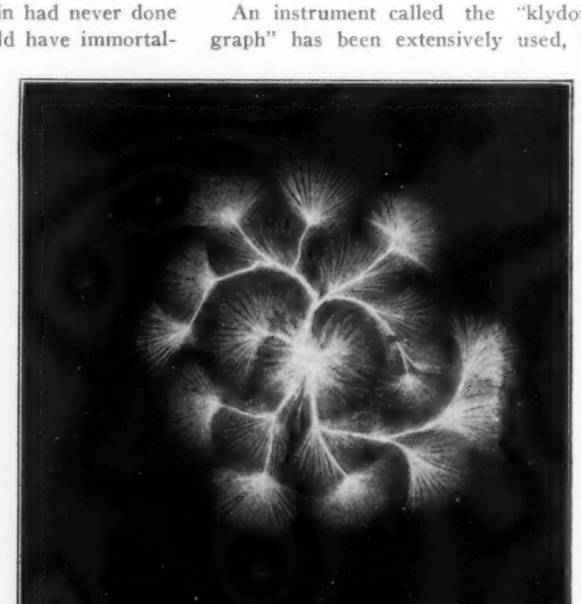


Fig. 2. Negative Klydonograph Figure.

cause of its simplicity, for securing figures of lightning surge voltages which indicate the magnitude, but not the duration, of the surge. Specimen records obtained by this instrument are shown in Figures 1 and 2. The magnitude of the voltage is indicated by the size of the light spot and the aspect of the figure tells whether the voltage was positive or negative.

No Way to Measure

Until recently, there has been no way to measure the time which a surge of lightning voltage takes to grow from zero to its maximum value, or the time required for the surge to disappear. In more technical terms, the steepness of wave front of the lightning surge, and the length and shape of its tail were not definitely known. The cathode ray oscillograph has not been developed to a point where it can be used to record the changes in the lightning voltage during the period of the surge.

The magnitude of current in a lightning strike has heretofore been unknown except by rough estimates of doubtful reliability. An instrument called a "surge-crest ammeter" has recently been devised which, it is hoped, will enable dependable measurements of lightning current to be made. Another recent device is the "storm severity meter" which makes a sort of integrated record of lightning intensity, through successive short intervals of time.

During the last decade there has been much intensive research on lightning and it might be supposed that the subject is now well understood, but this is not the case. To say, paraphrasing Professor Shapley's quip on "Corpuscles," that knowledge concerning lightning has grown so rapidly in recent years that now we know practically nothing about it, would be going too far. While there is no other electrical phenomenon of the magnitude and character involved in lightning, by experience with which we may be guided, still, by compounding the results of field tests and laboratory experiments, direct observations, fragments of fast, a little theory, and a few modest assumptions, we arrive at a conception of lightning which perhaps is not wholly erroneous.

The Atmosphere

Lightning is a spectacular actor and the theatre of its performance is the lower portion of the earth's atmosphere, called the "troposphere." The atmosphere is a mixture of gases, a tenuous expanse of atoms, molecules, and other minute particles, darting rapidly in all directions, now and then colliding with one another.

Pure, dry air, at the earth's surface, is composed of about 78 parts by volume of nitrogen, a little less than 21 parts of oxygen and slightly less than 1 part of argon, with small amounts of carbon dioxide, hydrogen, neon, helium and other rare gases. The air, however, is not normally dry but contains water vapor in amount varying with climatic and weather conditions but averaging about 1.2 per cent. The air also contains ordinarily a small amount of solid material in the form of fine dust.

The atmospheric gases are prevented from diffusing into space by the earth's gravitational attraction. The air pressure at any point is the weight of the vertical column of air above it of unit cross-sectional area, and falls off with increasing altitude from a value corresponding to about 30 inches of mercury at sea level, to less than one-thousandth of 1 per cent of that value at an altitude of 100 miles. As water vapor and dry air do not have exactly the same weight, the barometric pressure is somewhat affected by the degree of humidity.

When the air becomes saturated, that is, when the limiting amount of water vapor at the existing temperature, is reached, some of the vapor condenses into minute water droplets. These may coalesce and fall as rain or, if small enough, may remain suspended in the air. A cloud or fog is an aggregation of such suspended droplets.

Free Region

Anyone who is afraid of lightning can find a region free from it by ascending vertically into the air about seven miles where he will find himself at the base of the region known as the "stratosphere." The composition of the air at this point is about the same as at sea level, except that there is no appreciable amount of water vapor. The pressure has decreased to about one-fifth of its sea level value and the temperature has fallen to about -65° F., about 17° F. drop per mile of altitude. If our timid friend should ascend still higher, he would find that while the pressure of course continues to decrease, the temperature remains substantially the same, — -65° F. for he is in the isothermal belt. Since there is no moisture in this region, there can be no rain or snow. Thunderstorms and lightning are phenomena involving moisture and are limited to the lower atmosphere or troposphere.

In addition to the particles above mentioned, the earth's atmosphere contains important forms of energy. Light and heat are transmitted to us from the sun and stars by means of high frequency electromagnetic radiation. All rays which reach the earth proper, including the cosmic rays, must of course pass through the atmosphere, as must also radiation from the earth to outer space.

Electromagnetic rays are understood to consist of streams of minute corpuscles called "photons." Such rays pass freely through space at the velocity of light, but their motion is interfered with when they strike a material body or even a small particle like an atom, their impingement on such body or particle exerting a mechanical force. The pressure exerted upon the earth by solar radiation amounts to about 100,000 tons, which corresponds to about one ounce of repulsive force per 50,000 square yards of surface normal to the radiation.

Ionization

The formation of electric charges in clouds and the sudden dissipation of these charges which constitutes lightning, are intimately concerned with an electrical process known as "ionization." The term "ion" was invented a century ago by Faraday to designate one of the charged particles in an electrolytic cell, half of which are positive and travel in one direction, the other half negative and travel in one direction, when current passes through the cell between its two electrodes. It is now known that the earth's atmosphere also contains ions and that under some conditions they are very abundant in certain regions. The smallest known ion is the "electron," which carries one elementary negative charge and may roughly be regarded as an "atom of electricity." A particle having its normal quota of electrons is electrically neutral but on losing an electron, it acquires a positive charge equal in magnitude to the negative charge of the electron, it acquires a positive charge equal in magnitude to the negative charge of the electron.

Ions are produced in many different ways. They are found in solutions of metallic salts. They are shot out from the heated filaments of vacuum tubes such as are used in radio sets. They are emitted spontaneously in the atomic disintegration of radium and other radio-active elements. Streams of electrons expelled at high speed from the disintegrating atoms of radium constitute the so-called "beta rays." Radium also emits "alpha rays" which are streams of helium atoms positively charged, each atom lacking two electrons. A helium atom corresponds in mass to four hydrogen atoms and a hydrogen atom minus an electron constitutes a "proton," carrier of unit positive charge and smallest position ion,

(*Continued on page 22*)

PHONE BUSINESS PICKUP CONTINUES

PHONE CALLS INCREASE

An increase in the number of phone calls—both local and long distance—being handled at exchanges of the Indiana Associated Telephone corporation, in Elkhart, Middleburg, Wakarusa and Goshen, is reported by John W. Troyer, district manager of the company.

The number of long distance calls has shown a steady increase during the last few weeks. Local calls have also increased.

"To me this is a very definite indication of increasing business activity," Troyer said.

PHONE UPTURN SEEN

An upturn in telephone business is reported recently by H. G. Conger, Iowa general manager of the Northwestern Bell Telephone company.

"From early in 1931 up to a month ago there was an almost steady increase in the loss of telephones in services in Iowa. However, starting with February, this loss has been decreasing quite sharply.

There was a 33 per cent improvement in April over March. April also showed a 55 per cent improvement over January, and a 27 per cent improvement over April, 1932."

"April long distance business was 4.6 per cent better than that of March, and 5.5 per cent better than of March, and 5.5 per cent better than that of February," he stated.

"In addition," he said, "the revenue for each long distance call was the highest in March than it has been for many past months and the figure for April was not far behind.

"While these all are simply indications and, of course, are not proof that conditions are better permanently, they do provide encouragement. Also, they lighten the burden of having to make more and more economies in an attempt to keep as close as we can to a declining income."

LINES REPAIRED

Repairs have been made by the Western Illinois Telephone company on nine rural lines, south and southeast of Aledo, Ill. The lines were damaged by the Pope Creek flood waters recently.

More than one hundred subscribers were affected by the damage which took out poles and wire in the Pope creek valley.

BOOSTS EXPENDITURES

The Bell Telephone company of Pennsylvania has increased its total appropriations for the year to date to $1,252,038 as a result of the directors approving an appropriation of $289,741 for essential replacements.

IMPROVE PHONE SYSTEM

T. W. Doll of Texarkana, Texas, stockholder and foreman of a crew of men have just completed a six months' project for the United Telephone company. All posts on the main thoroughfare have been removed and a new and more modern set of wiring has been installed. The company moved their office and have made many improvements in the interior workings of the system.

EXPANDS PHONE PLANT

Enlargement of the Main and Termino central office facilities of the Associated Telephone company, Ltd., in Long Beach, Calif., at a cost of $57,000 and employing thirty additional telephone men has been announced by A. L. Hart, operating vice-president of the company. The work consists of installing machine switching equipment to handle 600 additional lines in the Termino office and at the same time cutting into service equipment now installed in the main office.

The project also involves the placement of 16,000 feet of aerial and underground cable.

"Due to the rapid growth of Long Beach the east office at Fourth street and Junipero avenue has been removed from the wire center of the area it serves and our company has had under consideration for the past five years the project of abandoning that office," Mr. Hart said.

"When our main office at Sixth street and Elm avenue was constructed in 1930 machine switching equipment was installed in the office in contemplation of abandoning the east office. Likewise our Termino office was constructed with sufficient floor space to permit the installation of additional machine switching equipment which would handle the balance of our customers out of the east office."

INCREASE ADVERTISING

Expansion of the Michigan Bell Telephone company's advertising program, according to William H. Wagner, Saginaw, manager, present and prospective improvement in business being cited as the reason.

"We are expanding our advertising program because there appears to be a definite improvement in business conditions and a general feeling of confidence that this will continue," said Mr. Wagner. "These facts should result in increased buying of commodities and such services as are offered by the Michigan Bell Telephone company."

One of the factors tending toward business improvement, said Mr. Wagner, is the "Vacation in Michigan" campaign being conducted by Michigan Bell, which is expected to increase telephone traffic in the state.

ADDS SUBSCRIBERS

Many new subscribers have been added to the list on the Coloma exchange of the Michigan Bell Telephone company, it is reported.

REPAIRS EXCHANGES

Repairs have been made in the telephone exchange at Alta, Ia., it is reported. Much of this work has been needed for some time, and it was deemed best to make the repairs now, before it would require a much larger expenditure.

PICKUP IN NEW YORK

The New York Telephone company, which operated approximately 20 per cent of the telephones of the Bell system, had a net loss of 14,122 instruments in May, which compares with a net loss of 20,551 in May, 1932. Last month 56,051 telephones were installed, or 4,199 less than in May, 1932. The number of instruments disconnected last month was 70,173, or 10,638 less than in the same period of 1932.

The May figures compare with a net loss of 14,575 in April, a net loss of 19,163 in March, 18,850 in February and 19,328 in January. For the first five months of this year the net loss aggregated approximately 5,000 more than in the corresponding period of last year.

ON THE UPGRADE

Business is definitely on the upgrade. That is the conclusion of Charles M. Rice, manager of the LaPorte exchange of the Indiana Associated Telephone company, based on the increase of telephonic traffic since the first of the year.

Since January, Mr. Rice said, telephone tolls have been gradually increasing, increases being recorded each month, over the preceding month, since January.

A second gauge offered by the telephone company, pointing toward improved circumstances among the rank and file of families in the city are the number of new telephones being installed and the number of instruments being reinstalled. This increase has been most noticeable in the past nine weeks.

Conditions observed in the local telephone exchange are parallel to those observed over the state. Recently Mr. Carroll, president of the Indiana Bell Telephone company announced that toll business over the state has been increasing from eight to 10 per cent a month since the first of the year.

EXTEND SERVICE

Plans have virtually been completed for a continuation of the Ozark Central Telephone company lines from Gravois Mill to Huricane Deck and Sunrise Beach, Mo., large development projects of the Lake of the Ozarks, south of Versailles, Mo.

A guarantee of a certain amount of money to be collected from toll calls has been guaranteed the Ozark Central company and work will start almost immediately upon the construction of the lines.

A central office will be established at Sunrise Beach and lateral lines will be connected from the many other points in that section.

ALTERS BUILDING

The Southern California Telephone company is altering its telephone exchange building.

MORE INSTALLATIONS

An indication that business in general is improving in Borger, Tex., as well as is reported in the manufacturing districts of the east, was told by P. C. Cayton, manager of the Southwestern Bell Telephone company at Borger.

Telephone installations in Borger during June exceeded disconnections for the first time during the past 16 months, according to Mr. Cayton; a pleasant comparison to the potential business possibilities of the company as shown for nearly the last year and a half.

The upward trend as evidenced by an excess of installations of new telephones is further made manifest by the increased use of long distance messages here which have advanced 25 per cent during June over the recent run of business, says Mr Cayton.

SALES DRIVE SUCCESS

The Union Telephone company sales for the month of May, through the employes service selling plan, were the largest sales ever attained by the company under this plan. The sales reached a total of 240. Of the seven districts three showed a decided gain, one broke even and three showed a slight loss.

W. J. Melchers, president and general manager with offices at Owosso, Mich., stated, "Business undoubtedly is picking up and the company's toll business has materially improved."

The Edmore district, of which Fred M. Dart is manager, showed the greatest gain of any of the seven districts, reporting installation of 20 telephones for the month of May. Alma was second with 15.

REPORT CHEERFUL

Officials of the Northwestern Indiana Telephone company find cheer in the May statement of operations. It was the first month in over two years that new station charges (phone installations) came anywhere near balancing accounts with "take out" orders.

Kouts, Chesterton and Ogden Dunes exchanges gave the pick-up with Valparaiso, Hobart and Wheeler giving the losses.

The summer season activities in the north part of the county accounts for the showing at Chesterton and Ogden Dunes while the gains at Kouts are attributed to better farm prices which have encouraged farmers in the southern section of the county. Manager H. R. Ball expects June to make a good scoring and if general conditions improve, to have an active fall.

According to Mr. Ball, Hobart and Hammond are the two hardest hit telephone centers in the United States. The reopening of banks in each town promises betterment as does increased industrial activity, giving employment. Toll business of the local phone company, is picking up and resort business in the lake region, is bringing the seasonal pick-up.

"ROTTEN SERVICE" IS TRACED TO THIEVES

The cause of the "rotten service" which telephone subscribers complained about in Detroit recently, was explained in the Recorder's Court.

Otto Lemhagen, chief investigator for the telephone company, testified that when complaints reached his office linemen were sent out. They found Otto Holwedel and Howard Hilkey climbing telephone poles and cutting out lengths of copper wire, he said. Questioned by Judge John A. Boyne, the two admitted cutting the wire, expecting to sell it.

They were fined $25 each with the option of a 30-day jail term.

A SELLING TALK

Infrequent interruptions, through storm or mechanical trouble, in the telephone service serve as a reminder of the way in which this system of communication has been wrought into the very fibre and substance of modern life. It is one of those great conveniences, or blessings, which are taken for granted and little appreciated. It has become second nature to believe that it is only necessary to take down the receiver to be brought into instant touch with anyone with whom it is desired to speak on business or personal affairs.

In one sense, it is a striking tribute to the excellence of telephone service that people feel so lost and bewildered when it is broken off suddenly. Such accidents are rare. And as the years pass they become rarer.

Temporary breakdowns of the telephone service are a vivid reminder of the way in which this complicated life of today has come to depend upon it. Without thought or question the great mass of people have come to accept it as one of the necessities. That it should not always be instantly at command has come to seem incredible. The loss of it means not only delay and discomfort, but often may mean a peril to life or property.

A whole generation has grown up to which the telephone appears indispensable. It is accepted almost as if it were a gift of nature. Only when something goes wrong with it, does one stop to realize that it is the result of inventive skill and the application of vast capital. Some people rashly say that it adds to the annoyances of life, but it is certain that without it the complex civilization of today could not go on.—*Ottawa (Ill.) Times.*

THE TELERING---AND ITS OPERATION

By
FRED J. HEAVENS
Sales Manager
Telkor, Inc.

TELEPHONE engineers have been striving for years to develop a satisfactory means of producing alternating current for telephone signaling which would embody such characteristics as past experience has shown to be desirable. The requirements of major importance are that the primary source of power supply be the regular lighting circuit; that the first cost be low; that the unit be simple and compact; that it operate for long periods without attention or replacements; that the wave form be correct; that it be practically noiseless and current consumption small.

With these specifications in mind, a frequency changer called Telering was developed and is manufactured by Telkor, Inc., Elyria, Ohio.

There are numerous applications for this device, but that of telephone signaling only, is referred to herein.

The apparatus is composed mainly of a vibrating reed with an adjustable contact, a motor coil for operating the reed, a transformer, and two lamps.

Rigid Contact Control

The reed is tuned to a natural frequency of 40 cycles per second for a primary current of 60 cycles. The action of the reed is that of a combination of two pendulums of different frequencies, controlled by a rigid contact placed about one-fourth of the reed length from the suspension point and results in the contact being closed one-third of the period necessary for the reed to complete one cycle.

The motor coil serves to keep the reed in continuous vibration. A transformer is used to obtain the desired secondary voltage and to insulate the ringing circuit from the power circuit. The lamps act as compensators and are inserted in the motor coil and transformer circuits to limit and regulate the current in the respective circuits.

For telephone signaling one method of connecting the apparatus is shown schematically in Figure 1. A circuit composed of capacitance and reactance is shunted around the single contact to absorb the inductive discharge of the load circuit. There are two primary circuits connected to power mains and one secondary output circuit. The first primary circuit includes contact screw, reed, transformer primary and compensating lamp. The secondary circuit contains the transformer secondary winding only.

Reed Kept Vibrating

Each time the circuit is closed through the contact screw and reed, an impulse is sent through the motor coil and the transformer primary. The contact is closed when the reed is stationary and when current is applied to power terminals the first impulse through the motor coil causes the reed to swing toward the coil and away from the contact screw, opening the circuit. The opening of the circuit de-energizes the coil and the reed swings back and again closes the contact. The contact being common to both of the primary circuits, each time the contact is closed an impulse is also sent through the primary winding of the transformer. In this manner the reed is kept vibrating continuously through impulses in the motor coil and the transformer is excited with the same impulses.

Referring to Fig. 2, the motor coil, reed and contact screw are so arranged that the reed can make a wide sweep in either direction. When the motor coil is energized, the free end of the reed is attracted toward the bent pole-piece on the end of the coil. At the start of this movement the contact is opened, but the momentum imparted to the reed carries it beyond the tip of the pole-piece. At the end of this stroke the reed swings back against the contact and again the momentum of the reed carries it beyond its point of rest in the opposite direction.

Reed is Flexed

In its sweep toward the motor coil, the reed is flexed at its suspension point and in the opposite direction, during the last third of its stroke, it is flexed at the contact point. During two-thirds of a complete cycle, the reed swings at a frequency one-half that of the remaining one-third and results in the contact being closed just one-third of each cycle of the reed.

The reed is tuned to vibrate at 40 cycles per second and the contact is closed for one-third of each cycle so that the contact is closed exactly 1/120th of a second for every third 1/120th of each second. Now, if a 60 cycle current (120 alternations) is applied to the vibrator unit, the contact will be closed during each third alternation (plus and minus) and will impress upon the primary winding of the transformer a characteristic 20 cycle current, the contact always opening and closing at zero potential.

Contact Screw Adjustment

The adjustment is accomplished by backing off the contact screw until the circuit is open and the reed stops vibrating and then turning the screw slowly inward until a point is reached where the reed vibrates at its natural frequency (evenly), which condition is easily recognized visually. Because the reed is self-starting it will get in step with the line frequency immediately and remain so regardless of ordinary fluctuations.

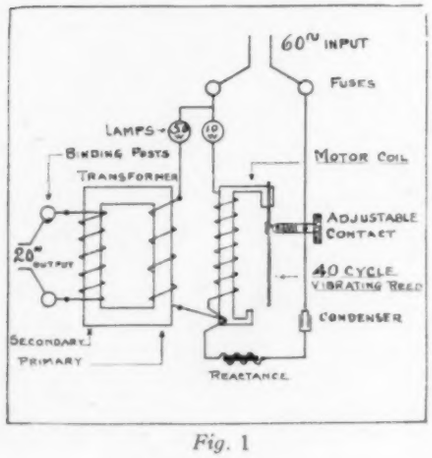


Fig. 1

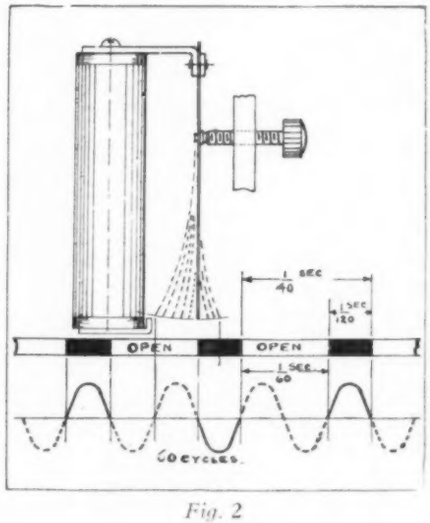


Fig. 2

The contact depreciation is practically nothing and what little there may be over long periods will be due to mechanical wear and is readily taken up with the adjustment screw.

Short-circuiting any leads or terminals, except those of the power supply, does no harm and in this state it consumes only the amount of current taken by lamps in the circuits, because the line supply is delivered through lamps and not directly into the primary winding of the transformer as is the usual arrangement.

In the operation of telephone bells, a

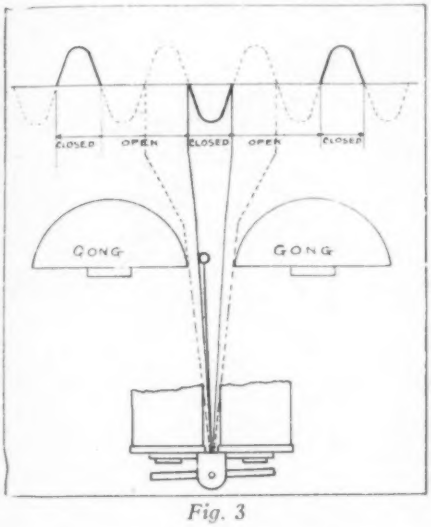


Fig. 3

clear tone is had from gongs through the use of this wave form, as illustrated in Fig. 3, for the reason that during the time interval between the 20-cycle lobes the bell hammer, due to momentum is being brought into contact with the gong and rebounding in the opposite direction,

Fig. 4

simulating piano-key action, and when the contact closes and an impulse is sent through bell windings the hammer is already started in its proper direction, tending toward more perfect syncronism between ringing device and bells, thus producing a more satisfactory and pleasing signal.

Not Puncture Cable

Each of the two gongs of a telephone ringer has a natural period of oscillation as does the ringer-movement itself and seldom are the three syncronized, therefore the gongs and riger-movement should be free to oscillate at their natural frequencies, the exciting impulses acting only to keep the hammer in motion. Furthermore, this wave form will not puncture cable and switchboard insulation.

The integral parts of the Telering are self-container units assembled within an aluminum casting housed in a compact black enameled steel cabinet, its size being only 12x9x5 inches.

Each machine is equipped with a built-in type of radio disturbance suppressor, making it proof against this form of interference which is so frequently annoying.

The machines are furnished for 110 and 220 volt alternating power supply.

PLANS LAKE-TO-LAND RADIO-PHONE

A LAKES-TO-LAND radio-telephone service for vessels plying the Great Lakes, giving first telephone facilities between ships and from ship-to-shore on the lakes, is projected by the Lorain Telephone company, Lorain, Ohio, it has been announced

The network of radio-phone communication would cover the five lakes, with shore units at various focal points. Shore units for the system would be established near Duluth, near Chicago, on the upper Michigan peninsula, and on Lake Ontario if the St. Lawrence waterway is completed. Boats would be equipped with radio-telephone equipment, operating exactly as the ordinary telephone.

According to plans made by Robert E. Fox, chief engineer of the Lorain company, such a system would cost approximately $100,000.

The Lorain company entered an application to operate such a system and it was protested by the American Telephone & Telegraph company and the Radio Corporation of America.

Coastal telephone service on the Atlantic, Gulf and Pacific seaboards of the United States already has been installed by the American Telephone & Telegraph company, and they claim that radio-telephone service on the Great Lakes now is premature.

At a hearing held in Washington, June 23, the Lorain company was represented by Frank C. Dunbar, its attorney, and A. L. Geiger, attorney for the United States Independent Telephone Association. Three witnesses were called to testify. H. E. Hageman, general manager, R. A. Fox and E. I. Deighan were the witnesses.

The R. C. A. Communications company and the A. T. & T. company were notified as respondents. The examiner for the Federal Radio Commission, Ralph L. Walker, gave these companies an opportunity to file an appearance at the hearing. R. C. A. did not enter a formal appearance and their representatives only asked to be present as interested observers. The A. T. & T. company was represented by their attorney and an engineer and entered an appearance, however, they did not take active part in the hearing.

The witnesses for the Lorain company presented testimony to show that the company was financially able to construct and operate such a system, also presented testimony regarding the technical construction and operation, and data establishing the fact that there existed a demand for the service and that it was in the public interest, convenience and necessity.

The examiner for the Federal Radio Commission will make a formal report on the testimony presented and also made recommendations to the commission. The commission then makes a final decision in the case.

TELEPHONES AND THE KING'S ADDRESS

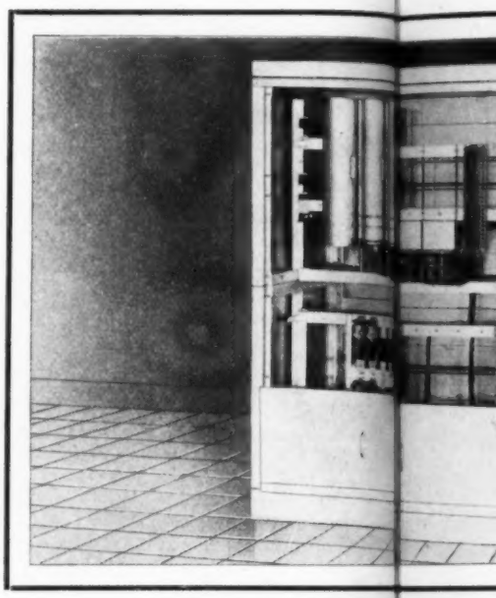
One of the largest radio networks ever set up outside of the United States enabled all of South America to hear King George's address at the opening of the Monetary and Economic Conference in London June 12.

The big radio station near Buenos Aires which picked up the broadcast from London and all of the telephone circuits interconnecting the network of sixteen broadcasting stations are operated by associated companies of the International Telephone and Telegraph corporation.

THESE NEW SELF-CONTAIN
THE MAXIMUM IN SVI

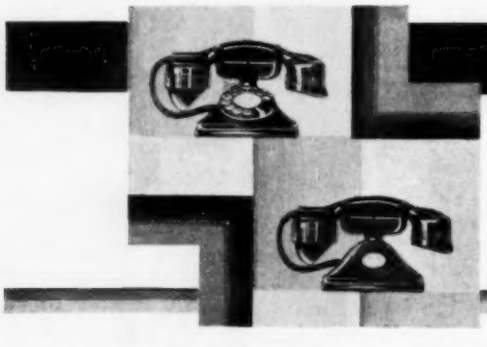
THE full automatic service rendered by the new Strowger C-A-X's is equal in every respect to that furnished in city automatic exchanges. It is quick—with a promptness and dispatch unequalled by any other method. It is uniform—with the same definite regularity day and night. It is accurate—with the exactness and dependability obtainable only with automatic equipment. And all of this entirely without local traffic expense to the telephone company.

Now, with the perfection and simplicity of the new line of self-contained C-A-X's, this method of operation is being adopted by telephone companies who previously considered automatic switching equipment out of their financial reach. All of the new types have been greatly simplified, while retaining all previous service features. They are consequently lower in cost and require even less attention in operation. Types are now available for central battery and magneto operation, for metallic or grounded lines, and using either standard step-by-step switches or all-relay equipment.



The illustration shows ...e 32-A-32 C-A-X switching unit ...es and bat... Everything necessary to ...f the central ...ment is mounted on the ...d housed un... steel cover—an arrange...ical of all ... contained C-A-X or R-C... exchanges.

If you will give us the ...facts and ... small exchanges, our eng...ll gladly ... showing the savings pos... C-A-X ... from these facts will be ...recomm... switchboard best suited ...eds.



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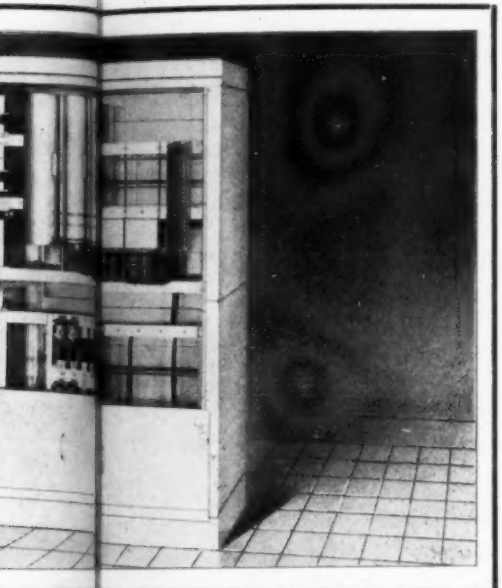
OAINED C-A-X'S OFFER SVICE AND EARNINGS



tion shows pe 32-A-32 self-contained hing unit ies and battery charger. ecessary to the central office equip- nted on the d housed under the same an arrange ical of all Strowger self- A-X or R-C exchanges.

e us the facts and figures on your our eng gladly prepare a study ngs pos C-A-X equipment, and will be recommend the type of suited needs.

Some Standard C-A-X Switchboards

TYPE 32A32 C-A-X—Capacity up to 90 local lines and 14 local connections; central battery system; uses rotary and Strowger type switches.

TYPE 32A44 UNIVERSAL C-A-X—Capacity 10 to 90 local lines and 14 local connections; for handling, without any auxiliary equipment, magneto or central battery telephones and metallic or grounded lines; uses rotary and Strowger type switches.

TYPE 33A1 C-A-X—Capacity of 50 lines and 6 local connections; for magneto or central battery telephones and metallic or grounded lines; finder system using relays only.

TYPE 33A29 C-A-X—Capacity 90-180 lines; central battery system; uses Strowger type finders and connectors.

TYPE 33A30 C-A-X—Capacity 180-400 lines; central battery system; uses Strowger type finders, selectors and connectors.

TYPE 15—C-A-X—A connector-per-line system for magneto telephones having a normal maximum capacity of 25 lines.

TYPE 32A7 AUTOMATIC SUB-EXCHANGE—Capacity, ten stations and one or two central office trunks; secret or non-secret service; for central battery dial telephones; uses rotary switches and relays.

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LIGHTNING—EFFECT ON PHONE SERVICE

(*Continued from page* 15)

although 1,800 times as massive as the electron.*

Absorption Cause

Of the radiation from the sun which reaches the earth's outer atmosphere, it is estimated that about 1/3 is lost by scattering and reflection into space, 1/3 is absorbed in the atmosphere, mostly in the highly rarefied region of the outer atmosphere, and 1/3 reaches the earth proper, most, if not all of which is later reradiated. The absorption of radiation is one of the causes of ionization of the air. The impingement of cosmic rays, rays from radioactive substances, and solar rays, particularly rays in the ultraviolet range, upon molecules or atoms in the atmosphere, not only reacts on the rays but releases ions from the atoms. Also an ion moving at more than a certain critical speed, by colliding with an atom or molecule, may dislodge therefrom another ion. Ionization of the atmosphere is also produced by meteors which are continually bombarding the earth, but these are for the most part dissipated before they have penetrated far ino the outer atmosphere. Also it has been found by laboratory tests that ionization is produced when drops of water are broken up by an air blast, electrons being liberated or taken up by the smaller particles while the larger droplets are left positively charged. This action, which apparently is a form of frictional electrification, is thought to play an important part in the production of electric charges in clouds.

Moisture in the air tends to collect around particles of dust and free ions have a tendency to attach themselves to the water droplets. It is believed that solar radiation, insofar as it is absorbed in the lower atmosphere, is mostly expended by charging particles of moisture. Under the influence of high electric potentials, free ions are capable of moving at enormous speeds, but when such an ion becomes attached to a relatively enormous water droplet to form a large ion, it loses much of its mobility. Since the electric conductivity of air depends upon the mobility of ions, moist air is less conductive than dry air. Similarly free electrons increase the conductivity of air more than free protons and small ions more than large ions, since the latter have less mobility.

*The discovery of a corpuscle having the same mass as the electron but with unit positive charge instead of negative, has recently been reported. If the existence of such a free corpuscle is confirmed by further investigation, it may be called a "positron," and the present electron renamed "negatron," the significance of the word "electron" being changed to include either negative or positive free corpuscle.

Free Electrons

Thus we visualize the lower atmospheric space as populated by corpuscular bodies of particles, some positive, some negative, but most of them, normally, neutral. The negatively charged particles include free electrons, small ions or clusters of atoms and molecules, and large ions, i. e., water droplets or other minute bodies, having an excess of electrons. The positively charged particles include free protons and small and large ions which are deficient in electrons.

There is an increase in electric potential with increasing altitude, the potential gradient diminishing with the altitude and also varying from time to time and from place to place, but averaging near the earth's surface about 30 volts per foot. Thus a mile in the air, the potential is ordinarily about 100,000 to 150,000 volts above earth potential. There results a gradual and continuous movement of ions up and down through the atmosphere, from and to the earth, the prevailing direction of ion movement being that corresponding to the loss of negative ions by the earth. This ion movement corresponds to a current to the earth of about 1,000 amperes average value which is compensated for by reverse transfer of ions by lightning, rain, convection, and other agencies.—*Bell Telephone Quarterly.*

This article will be continued in a future issue of TELEPHONE ENGINEER.

TELL THIS TO BUILDER AND ARCHITECT

When plans are first being considered for remodeling or redecorating, whether one or two rooms or the entire house, is the time to make sure that the telephone service will be as convenient and up-to-date as the rest of the household equipment.

Modern home convenience requires at least one extension telephone, for the saving of time, steps and energy. With the main telephone in the living quarters, an extension telephone in the bedroom not only saves annoying trips to answer the telephone after retiring, but offers a real measure of protection. Many women are also finding another extension in the kitchen one of the handiest items of their household equipment, since so much domestic activity centers there.

Another very useful instrument is the portable telephone, which plugs into a wall outlet just as do lamps, toasters and other electric devices. Portable telephones supplement the main telephone and permanent extensions in the house, and have proved their usefulness in connection with outlets in such places as guest room, sun porch, or game room.

Where structural changes in the house are contemplated, a simple way of concealing telephone wires is to place half-inch pipe within the walls from the cellar to the point where the telephone will be located. The telephone company then runs its wires thru this pipe when making connection with the telephone instrument. A few feet of half-inch pipe, placed within the wall from the cellar to a bell box cabinet recessed in the wall above the baseboard on the first floor, will keep both the telephone wires and the bell box out of sight. Pipe similarly placed within the wall from the cellar to telephone outlet in the bedroom will provide extension telephone service without visible wires. Incidentally, extension telephone service may be provided from one pipe by placing outlets on both sides of the separating wall.—*Ottumwa (Ia.) Courier.*

RATE CUT NO HELP TO BUSINESS

The Wisconsin public service commission, which contemplates renewal of a 12½ per cent reduction in rates of the Wisconsin Telephone company, was told that this move would not make telephone service available to any additional customers.

Frank M. McEniry, general commercial superintendent of the telephone company, said that the reduction would bring a saving of less than 2 cents a day to 97.8 per cent of the company's subscribers, while it would effect the company seriously.

Dissatisfaction with rates has been a minor factor in decreases in telephone business, McEniry said. The subscriber list dropped off more rapidly after the commission ordered the reduction and undertook its current study of the company's rates and practices than before, McEniry said, adding that the company's business is growing again.

COMMON SENSE

Madison, Wis., policemen must have telephones in their homes so they can be reached in emergencies, the board of police and fire commissioners, meeting in Central fire station, has ruled.

The rule was adopted at the request of Chief William H. McCormick.

The fire department has had such a rule for about 18 months and Otto A. Graack, of No. 5 station, was called before the commission to explain why his telephone was disconnected.

Graack blamed financial difficulties. Fire Chief John Lahm was instructed to investigate the Graack case, including circumstances which caused him to get into debt, and report later.

SERVICE TESTS IN EXCHANGES

(*Continued from page* 13)

transmission talking test should be repeated several days later to make sure that the battery has been properly installed and the transmission meets present-day standards.

It is now possible to purchase telephone dry cells in pairs enclosed within a single cover with the center connection soldered at the factory. This simplified unit makes it more convenient than ever before for the rural patron to install the new battery when it is mailed to him. These battery units are also available with three dry cells within one cover for those telephones whose transmitters require this number.

One convenient method of accurately determining the end point of the average useful life of a telephone dry cell makes use of the No. 35 battery gauge shown in Fig 3. The use of this meter will prevent discarding dry cells before they are worn-out.

Price of Good Service

It is suggested that each dry cell be tested separately for service capacity since, from time to time, brands may be used with which extensive experience may not be had, and this practice will assist in determining the uniformity as well as the average performance.

When testing single cells with the watch-sized gauge pictured in Fig. 3, the spring clips at the end of the 18-inch cords are connected to the cell and the stem of the meter is depressed for one minute. If the needle of the gauge falls below (to the left) of the cut-off point marked *one cell,* the dry cell is used up or defective and should be replaced.

Every effort should be made to eliminate interruptions and irregularities and to properly care for the complaints that arise, because eternal vigilance is the price of good telephone service.

AN IDEA FOR EMPLOYEE SALES CAMPAIGN

In an "all-employee" sales campaign, the Continental Automobile company has provided employees books of patronage cards, which are handed to every merchant with whom they have business. This plan could be easily adopted by telephone companies carrying on employee campaigns.

These cards, signed by the individual worker, announce that "the patronage that comes from me and my family is made possible through compensation received from Continental Motors Corporation or from one of its subsidiary companies.

"I am interested in increasing the business of my company and you can help me in my efforts to do so by using personally and in your business one or more automobiles manufactured by the Continental Automobile company. Purchases of these automobiles by you and through your influence will help to make my job permanent and will be appreciated by me."

Each worker is also being provided with a sales certificate book to be used to certify that the introduction of prospect to dealer was arranged by a particular employee.

Employees will also be given commissions on cars which they "sell" to themselves.

PAPER PRAISES A. T. & T. ADVERTISING

The advertising of the American Telephone & Telegraph company has been regarded by most people in the advertising business as the best of all the utility copy. For years it was devoted chiefly to building up appreciation of the telephone as a public service, and one of the most valuable results, if not that at which the advertising was specifically aimed, was almost universal acceptance among investors of the stock of the A. T. & T. as impregnable from the standpoint of earnings and safety.

The business shrinkage, touching practically all lines, has unavoidably reduced demand for telephone service. The number of telephones in use has declined sharply, and the demand for the equipment of the Western Electric company, manufacturing subsidiary of A. T. & T., has declined with it. Some financial writers have been peevish because telephone rates have not been reduced as a means of getting phone service back to the peak level, but A. T. & T. and its local operating companies have taken a far better course, it seems to us, in looking to advertising to restore some of the lost volume.

The telephone is such an obvious business necessity that its use must ebb and flow with the volume of commerce. With business activity greatly curtailed, the market for telephone service has shrunk unavoidably. In addition, widespread unemployment has reduced incomes to a point which has made even the telephone a luxury for some, to be dispensed with until times are better. It is doubtful if a reasonable rate reduction would induce a substantially increased use of the telephone among those who now feel either that they do not require or cannot afford it.

Advertising, on the other hand, can picture attractively the opportunities for increased use of the telephone among those who are still able to purchase an increased amount of service. The desirability of frequent human contacts made possible through the long-distance, added conveniences in the home brought about by the use of an increased number of instruments, new and worthwhile business efficiency provided through the teletype—all of these ideas are capable of being projected to the public through advertising so effectively as to insure increased business from those who are still good prospects.

Intensive local advertising by operating units, backing up the splendid national campaign of the parent Bell company, should go far toward offsetting the losses that it was impossible, under the conditions, for the telephone industry to avoid.—*Advertising Age.*

USE THIS ARGUMENT

While commodity prices during the war soared to unheard of heights and since the war have ket a more or less general level with limited ups and downs, telephone rates merely rose slightly in 1918 and have remained at that level, according to an interesting graph shown by M. E. Bernet, of Denver, advertising manager of the Mountain States Telephone and Telegraph company in Sante Fe, N. Mex., recently. The graph showed that the present downward trend of commodity prices has descended for the first time slightly below the phone rate level, but Mr. Bernet pointed out that the 10-year average is tremendously lower than had telephone tariffs followed the ups and downs of general prices. This is the argument with which the company meets demands for lower rates at this time. At the same time the company points out that value of the service has increased to a great degree. In this connection it is interesting that there are 2,263 telephones in Sante Fe as against 1,400 in 1927. Manager Phillips stated there had been no raise in rates here for five years.

TELEPHONE MEN
Who Made News

The history of the telephone in Nebraska is told in a manuscript presented to the Nebraska state historical society by GEORGE KLOIDY, secretary of the Nebraska State Telephone association. The bound volume also contains the telephone history of every town in the state.

GUY W. BRENTLINGER, equipment superintendent of the Lima (Ohio) Telephone and Telegraph company, was installed as president of the Lions club recently.

The pioneer telephone men seem to be inclined to get out of harness and take a vacation. BOB BABINGTON, who had engineered the telephone business in Gastonia, N. C., for 34 years, and JAMES NORTHEY, who was in on the first telephone call in Charlotte, N. C., 47 years ago, have retired from service. Mr. Northey's and Mr. Babington's long careers in the telephone service have been marked with a courtesy that has proved the admiration of the publics they have served, a uniformly polite attention to all manner of requests that established them in the popularity of the people. They retire with a record on which they have reason to reflect with pride.

In recognition of his contributions to industry, engineering science and research, the University of Maine on Monday, June 12th, conferred upon one of its sons, RAY H. MANSON, vice-president and director of the Stromberg-Carlson Telephone Manufacturing company, the honorary degree of doctor of engineering. Mr. Manson graduated from the Orono, Maine, institution in 1898.

He is one of the best known personalities in the telephone and radio field, having continually contributed to both with inventions and writings. In 1931, his fellow engineers honored him by electing him President of the Institute of Radio Engineers.

For the past seventeen years, Mr. Manson has been chief engineer for the Stromberg-Carlson company. It has been largely through his efforts that the company's products have attained a world-wide reputation for quality, reliability and performance.

After Mr. Manson's graduation from the University of Maine, he taught school for a year, at the end of that time going with the Western Electric company in its experimental Laboratory. From there he took a position as assistant chief engineer with the Kellogg Switchboard and Supply company in Chicago. In 1905 he went with the Dean Electric company of Elyria, Ohio, where he was a director of the company and chief engineer. He left this position to come with the Stromberg-Carlson company.

LIEUTENANT COLONEL E. M. STANNARD of Detroit, who was director of telephone and telegraph service with the American Expeditionary forces in France during the world war and was decorated by both the United States and France, has been elected president of Wolverine Chapter, No. 10, Telephone Pioneers of America. Colonel Stannard succeeds A. E. Huntley, Saginaw, as president of the chapter.

JOHN S. KENNEDY, general secretary of the general employes benefit committee of the New York Telephone company, which conducts the pension department and extensive welfare activities of the company, has been retired under the automatic retirement rule of the company after 20 years of service.

Mr. Kennedy is widely known in Syracuse and the upstate. As a member of the State Commission of Prisons, he conducted a number of hearings upstate.

From 1898 to 1905, Mr. Kennedy was postmaster of his home city of Corning under Presidents McKinley and Roosevelt, and from 1905 to 1913, secretary of the State Railroad Commission and Public Service Commission.

W. ROY McCANNE, president, Stromberg-Carlson Telephone Manufacturing company, has been appointed chairman of the Radio Manufacturers Association's committee to gather radio industrial facts for the Government if called upon to do so. Facts relative to production, costs, unemployment, labor, rates of pay required by the Government in efficient application to the Recovery Bill principles to restoration of prosperity will be assembled by the committee.

After fifty-one years of hard work, the past thirty of which have been spent with the Southern Bell Telephone & Telegraph company, of which he is state chief, CHARLES G. BECK has retired.

At 63, Mr. Beck has seen the telephone industry grow from an infant with 100,000 telephones in 1903, to a corporation of fifty billion dollars with more than a million telephones.

"I am retiring voluntarily," declared Mr. Beck, "because I want a little freedom."

R. B. STILL of Kansas City, formerly of Tyler, Texas, visited friends in his old home town. Mr. Still was during his residence in Tyler chairman of the City Plan Commission, president of the Chamber of Commerce and Rotary club, and manager of the Gulf States Telephone company. He has been holding a utilities position in Kansas City.

RAY BLAIN, A. I. E. E., editor of "Line and Desk," popular feature, of TELEPHONE ENGINEER and member of the Signal Corps staff in Washington, D. C., paid a visit to Chicago recently, and said hello to the many friends he has in that locality. Mr. Blain was on a trip taking care of some work for Uncle Sam.

SOUND ADVICE IN THIS STATEMENT

One telephone manager has found that the surest way to keep his plant and his service in ship-shape condition. Commenting on the improvements he has made in his exchanges, C. E. Eaby, vice-president and general manager of the Denver and Ephrata Telephone and Telegraph company, Ephrata, Pa., says:

"My advice to telephone companies is don't wait if you have not already taken advantage of the low prices that the manufacturers are offering at this time. Our company first felt the depression at the end of 1931. *Then and there we decided that it was a good time to rebuild and give our telephone plant a general overhauling if we wanted to keep our subscribers' loss to a minimum.*

"We started with our Denver exchange by installing a new common-battery board and replacing all the bad poles and wire and all heavy leads were cabled. Subscriber stations were inspected and rewired and obsolete telephones replaced.

"We followed this up by giving our Ephrata and Lititz exchanges the same treatment. In addition, we erected an administration building at Ephrata because we thought it was an opportune time for building, prices were right.

"We used the following materials 500 *poles, six miles of cable,* 128 *miles of bare wire and* 50,000 *feet of loop wire, hardware and other miscellaneous equipment. When we checked up at the end of* 1932 *we found we had gained four telephones.*

"At the present time we are working on our Manheim exchange where we installed a new common-battery and giving the plant the same treatment as I described above. Better times are coming so get busy and get your plant in shape to take care of it."

KRAEGE JOINS BERRY COMPANY

Carl H. Kraege, general commercial manager, Indiana Associated Telephone corporation, with headquarters at Lafayette, Ind., has resigned to accept an appointment as sales manager of L. M. Berry and company, telephone directory advertising sales and publishing company, whose main office is located in Dayton, O. Mr. Kraege will have charge of the sales organization, which covers twenty states in the eastern and central portions of the United States, and in the south, including telephone directories which are issued for over 2,500 cities and towns.

Carl H. Kraege

Mr. Kraege received his first training in the telephone business as a groundman during vacations while he was attending high school in Boise, Idaho. He was educated at the United States Naval Academy at Annapolis, Maryland, and upon leaving the marine service at the end of the war entered the University of Wisconsin at Madison, where he worked his way through school as night wire chief and test man. After spending some time on telephone appraisal work he became interested in telephone directory advertising, and spent a number of years in this type of sales work in various states.

When the Kansas Telephone company was purchased by the Associated Telephone Utilities company, Mr. Kraege was transferred to the main office of the latter company at Madison, Wis., reporting to the general manager, and his duties consisted of traveling over the new telephone properties which had been purchased, for the purpose of taking over the properties and arranging for the management in groups and divisions, setting up the standard operating practices of the company, etc.

After a severe sleet storm which had badly crippled the LaPorte, Ind., area exchanges, purchased a short time before by the A. T. U. company, Mr. Kraege was sent there to rebuild the property, and at the same time manage it. In 1930 he was promoted to the position of general commercial manager for all of the telephone properties of the A. T. U. company in the state of Indiana, these later being consolidated into the Indiana Associated Telephone corporation.

Many of the Indiana properties needed public relations work badly at that time, and Mr. Kraege made an enviable record in this line of work.

In addition to his commercial duties he served as traffic superintendent for all of his company's properties for two years. Many successful employees' sales campaigns were conducted under Mr. Kraege's direction during this period, and the quotas set were exceeded in every case. In one campaign, lasting four weeks, in 1931, they sold 2947 telephones, which was 366 per cent of their quota, and at that time this was said to be the top record for all states in the A. T. U. system on employees' sales campaigns.

Mr. Kraege's experience in the telephone business and his success in sales activities should serve as an excellent foundation for his work with L. M. Berry and company. He will be located at his company's Philadelphia office for a few weeks, after which he will make his permanent headquarters in Dayton.

TO INSTALL MESSAGE TELEPHONE

Authority was received at the division offices of the Missouri Pacific for the installation of a message telephone circuit between Coffeyville and Osawatomie, Kan., at a cost of $3,000.

The new circuit will enable voice communication to transpire between station points on the division and will give the local division offices through voice communication with Kansas City, St. Louis and Wichita.

Only the dispatcher's circuit now is available for communication of this nature. Work will get underway at once on the project, Frank E. Griese, chief clerk to the superintendent, said this afternoon.

EAT SIR?

did you say eat?

Of course you'll eat and enjoy it . . . at the American and Annex Hotels.

Here, in the heart of St. Louis, you'll find cooking that will almost make you spend the night watching the clock go 'round 'til it points to breakfast time . . . we say almost, because chances are that when you get up to your cozy room and feel the soft springy sleep-inviting beds, you'll not be able to resist the impulse to crawl between the cool clean sheets . . . and next thing you know it's morning . . . Wouldn't you like to try it? You can . . . at

THE AMERICAN HOTEL
THE AMERICAN ANNEX
MARKET AT 6TH AND 7TH
ST. LOUIS · MISSOURI

TEXAS ASS'N DISCUSSES PROBLEMS

ELIMINATING all the frills of the usual convention, the Texas Independent Telephone Association, devoted the entire time of its annual Convention, June 14-15 to discussions of mutual telephone problems. The meeting was held in the Adolphus Hotel, Dallas.

J. Ben Critz, vice-president and general manager, Dallas Chamber of Commerce, gave the address of welcome, response to which was given by Sam H. Shutt, vice-president, Northern Texas Telephone company, Sherman.

President L. S. Gardner, general superintendent, Texas Long Distance Telephone company, Waco, gave his annual address which was followed by Secretary Oscar Burton's report. Mr. Burton is general manager, Gulf States Telephone company, Tyler.

Next on the program was a discussion on the "Situation as Regards Telephone Materials, Supplies and Equipment." Representatives of manufacturers made brief talks.

Gibbons Poteet delivered the main address at the Get-Together Dinner, Wednesday night. Mr. Poteet's subject was "A Neglected Industry."

On Thursday morning, a general telephone discussion at which Vice-President John Y. Rust presided, was held.

The first speaker was Judge S. A. Lindsey, president, Gulf States Telephone company, Tyler, who spoke on "The New Deal and Its Relation to the Telephone Industry." Judge Lindsey's address will be published in a later issue of TELEPHONE ENGINEER.

"The Present Situation from the Manager's Viewpoint," was discussed by C. L. Stewart, division commercial superintendent, Southwestern Bell Telephone company, Dallas.

C. C. Deering, Des Moines, Ia., secretary-treasurer, United States Independent Telephone Association, discussed "The National Telephone Situation."

R. B. Still, Telephone Bond and Share company, Portsmouth, Ohio, was the last speaker on the morning's program.

President Gardner presided at the Thursday afternoon's business session.

Following the business meeting the directors of the association went into conference.

At the close of the morning session the nominating committee presented the following list of directors, all of whom were unanimously elected.

Mr. Gardner, Mr. Burton, R. B. Fairly, C. E. Hoy, George M. Johnson, A. L. Robb, Mr. Rust, D. F. Schilling, Jean Shotwell, D. T. Strickland, J. E. Stuart, Merton Swift, J. C. Paxton, T. P. Bearden, Mr. Shutt, James Thompson and Lon J. Jester.

At the directors' meeting the following officers were re-elected:

Mr. Gardner, president, Mr. Rust, Mr. Beardon, Mr. Robb, vice-presidents, and Mr. Burton, secretary-treasurer.

The Constitution and By-laws of the Association were amended so as to remove any restriction on memberships, and here after the Association will be known as "The Texas Telephone Association" and will admit to membership (1) Any individual engaged in the operation, maintenance, or management of a telephone exchange (2) Any firm, corporation or company engaged in the operation of a telephone exchange (3) Any manufacturer or dealer in telephone apparatus or supplies, or any bona fide representative or agent of such manufacturers or jobbers, and the publisher, owner or representative of any telephone publication. Obviously, this will admit the Bell company and its manufacturing branch to membership, if they elect to become members.

Manufacturers' and Suppliers' Convention Headquarters at Stevens Hotel

	Room No.
American Automatic Electric Sales Company	2506 2505
Cook Electric Company	2508 2507
Electric Storage Battery Company	2558A
French Battery Company	2504
Inland Equipment Company	2514
Central Accounting Department, J. K. Johnston	2558
Kellogg Switchboard and Supply Company	2501 2500
Leich Electric Company	2509 2503
Lenz Electric Mfg. Company	2512
National Carbon Company	2510
North Electric Mfg. Company	2519A 2520A
Page and Hill Company	2508A
Reliable Electric Company	2501A 2502A
Roebling's Sons Company	2503A
Runzel Cord and Wire Company	2502
Sands Electric Company	2509A
Stromberg-Carlson Telephone Mfg. Company	2504A 2505A 2506A 2507A

EXPECT BIG ATTENDANCE AT CONVENTION

(*Continued from page* 11)

ployees"—Mr. John R. Hastie, Insurance Advisor, Chicago, Ill.

Address, "Preparation of Service Station Rate Cases"—Mr. I. J. DeVoe, General Auditor, Lincoln Telephone and Telegraph Company, Lincoln, Nebraska.

Address, "What is Wrong with Our Public Relations"—Mr. E. R. Hannibal, General Manager, West Coast Telephone Company, Everett, Washington.

GENERAL SESSION

July 13—A. M.

Address by Dr. David Friday, Washington, D. C.:

"A Discussion of National and International Economic Conditions."

PIONEER DAY

July 14—10 A. M.

Annual Meeting of Independent Pioneer Association.

Address by Mr. Wm. Rainey Bennett.

The Independent Pioneer Telephone Association of the United States will hold its annual meeting at 10 a. m. Friday, July 14, in the Tower Room, Stevens Hotel.

The meeting will consist of a short business session, after which William Rainey Bennett, nationally known speaker, will address the Pioneers.

Tickets to the World's Fair will be on sale at the Pioneers' registration desk.

United States Independent Telephone Association

CONVENTION PROGRAM

TUESDAY, JULY 11 — 10 A.M. OPENING SESSION

Report of Secretary Chas. C. Deering:
Special Discussion of "Credit on Insurance for Telephones."

Report of General Attorney Alfred L. Geiger:
"The Securities Act."
"New Taxes on Dividends and Capital Stock."
"Proposals to Prevent Appeals to Federal Courts from State Commission Decisions."

Report of President F. B. MacKinnon:
"The National Recovery Act as Applied to Telephone Companies."
"The Status of the Depreciation Order."
"The Revised Accounting System."
"Conditions in the Industry."

Appointment of Committees.

General Business.

WEDNESDAY, JULY 12 — 10 A.M. GENERAL SESSION

Address—"A Group Plan for Annuities for Independent Telephone Employees," by Mr. John R. Hastie, Insurance Advisor, Chicago, Ill.

Address—"Preparation of Service Station Rate Cases," by Mr. I. J. DeVoe, General Auditor, Lincoln Telephone and Telegraph Company, Lincoln, Nebraska.

Address—"What is Wrong with Our Public Relations," by Mr. E. R. Hannibal, General Manager, West Coast Telephone Company, Everett, Washington.

THURSDAY, JULY 13 — 10 A.M. GENERAL SESSION

Address by Dr. David Friday, Washington, D. C.:
"A Discussion of National and International Economic Conditions."

FRIDAY, JULY 14 — PIONEER DAY

10 A. M.—Annual Meeting of Independent Pioneer Association.
Address by Mr. Wm. Rainey Bennett.

Meetings in the "House on the Roof"

HOTEL STEVENS, CHICAGO

"Century of Progress", Every Afternoon and Evening

LINE and DESK

W. C. Dillon, Editor

Q.—What conditions had to be met in developing Zinc Meta Arsenite wood preservative?

A.—Conditions to be met consisted of getting a wood preservative that would have a high toxicity towards low forms of animal and vegetable life, that would have a low electrical conductivity, would be non-corrosive to iron, would be available in large quantity, would be paintable, and would be of low cost. These characteristics were only among inorganic substances. The toxic agent had to be in a solution to kill fungi, as vegetable organisms cannot ingest solid particles. It was established that acids are a by-product of fungus growth, and that this acid is of sufficient strength to dissolve with certain difficulty soluble salts. Such salts to contain at least one iron which is toxic to fungi. Investigation of the salts showed that zinc meta-arsenite had the outstanding characteristics of toxicity, permanence, non-conductivity, non-corrosiveness to iron, ease of handling, availability, and low cost. It is non-leachable (being less soluble in water than limestone), colorless, odorless and does not affect the natural appearance or paintability of the lumber.

Q.—What is a sound telegraph?

A.—The ground telegraph was the first type of wireless used during the late war. It makes use of ground currents and is operated by driving two spikes into the ground and impressing a buzzer or telegraph signal between them. A telephone connected between two similarly placed stakes at the receiving station, will pick up the signal, provided the base-line between the spikes is not less than twenty per cent of the distance between transmitter and receiver. The system was peculiarly adaptable to trench warfare during the late war.

Q.—What is the simple principle of "wire-wireless?"

A.—Wave phenomena occur upon the transmission of alternating currents over long lines. The circuit becomes so large physically in comparison with the wave length of the alternating currents, that the common assumption that the current is the same at every instant throughout the circuit is no longer correct. There are actually electromagnetic waves, traveling along the wire. Thus, if the frequency of the alternating current is within the radio frequency range, we have what amounts to radio transmission where the radiation is directed along a copper or metallic circuit. Such currents on a telephone line does not in any way affect the ordinary telephone receiver. Thus, this high frequency current can be superimposed upon an ordinary telephone line without interfering with its normal function.

Q.—What is the balanced bridge circuit used for secrecy with a buzzer telegraph?

A.—The scheme involved in a balanced bridge circuit contains a four-leg bridge excited by a buzzer that operates continuously. Head telephones connected across the silent bridge points, do not register the sound. Sound is only heard when the bridge circuit is unbalanced. In telegraphing, the key at the transmitting end serves to send a direct current impulse through one branch of the bridge circuit. This unbalances the bridge anl produces sound in the telephone. The time constant of the keying circuit is made sufficiently high so that ear-phones tapped into the line or earth current reception is impossible. The circuit is absolutely secret.

What reaction takes place when wiping soldier is stirred while it is being heated?

A.—Wiping solder when stirred while it is being heated does not properly mix the tin and lead unless it is stirred when it has reached the correct temperature for wiping cable joints. There is a certain temperature at which if the solder is stirred the tin and lead will become separated. Therefore, in order to be assured that his wiping solder is of a proper mixture, the cableman should see to it that it is stirred only at the correct wiping temperature. It might also be noted that when perfect solder consisting of 40% tin and 60% lead has been heated a number of times and allowed to cool, these two metals become separated and the only sure way of getting a proper mixture is to stir at the proper wiping temperature. It requires approximately 60 hours of continuous heat for the metals to become mixed if the solder is not stirred. Grystalized or porous joints are the results of improper proportions of tin and lead and of wiping joints with perfect solder used at an incorrect wiping temperature.

Q.—How is bituminized fiber conduit constructed?

A.—Fibre conduit is made from wood fibres, formed on a round mandrel into a tube having a wall thickness varying from ¼" to ⅜", and impregnated with a bituminous compound. The best fibre conduit on the market is made from northern mountain spruce, which is noted for its long, strong fibres. It, therefore, produces a conduit possessing extra mechanical strength, insuring a minimum of breakage. Pulp in its suspended state is built upon a tube or mandrel, then slowly airdried in order not to injure the strong wood fibres, which in the drying felt together to give a structure without lamination and thoroughly homogeneous, and the pressure impregnated so that each single fibre is thoroughly saturated with a compound which is not only waterproof, but likewise highly acid and alkaline resistant. After impregnating, the excess compound is drained off and the joints milled on with lathes.

Q.—What chemical action takes place on discharge and charge of a storage battery?

A.—In a fully charged battery all the active material of the positive plates is lead peroxide, and all the active material of the negative plates is pure sponge lead. The active material of both the positive and negative plates is porous so that it has absorption qualities similar to a sponge, and the pores of the active material are therefore filled with some of the battery solution at all times. The battery solution properly called "electrolyte" is a mixture of sulphuric acid and water. Concentrated sulphuric acid has a specific gravity of about 1.830 and water 1.000. The acid and water are

(*Continued on page 38*)

STROMBERG ANNOUNCES WAGE INCREASE

A GENERAL increase in wage and salary rates of 12½ per cent was announced Monday, June 26, to the employees of the Stromberg-Carlson Telephone Manufacturing company. The announcement, made by Wesley M. Angle, vice-president and secretary, at the direction of the Board of Directors, stated that the increase became effective Monday, July 3.

W. Roy McCanne, president, points out that the business of the company in both its telephone and its radio lines fell off largely from 1930 on, and eventually reductions were made in salary schedules. A good portion of this decrease is restored by the present increase. Mr. McCanne declares that with some increase in business and with prospects for further improvement reasonably assured, action has been taken to pass along some of this improvement to the employees at once.

Notice of Increase

The notice of the increase given by the company read as follows:

"Our business is beginning to show improvement. It was only after a large decrease in our volume that we were reluctantly compelled to reduce wage rates. We are moving to increase them at the first indication of larger volume. Therefore, in anticipation of further improvement and in line with country-wide efforts to stimulate better conditions, we are increasingly hourly and weekly rates approximately 12½ per cent, effective Monday July, 3, 1933.

To Meet Standard

"We intend to continue dealing with our employees just as fairly and liberally as we have in the past and at least to meet, and better if possible, any hour and wage standards which may be established by the government for our industry."

Of the six continents, Africa has the smallest number of telephones.

CARRIES MESSAGE TO THOUSANDS

Probably the most unique publication that is issued in Florida is the miniature newspaper, the "Sun Dial." Only 5x7 inches in size, it contains four pages and has about 30,000 subscribers.

These subscribers receive the Sun Dial without any cost to themselves, it being enclosed each month with the statements rendered by the Peninsular Telephone company in Florida. The purpose of the midget publication, as announced by the company, is "to help promote that mutual understanding and good will between the public and telephone workers which is so necessary for the best telephone service."

In a recent issue, there appeared a picture and a story on the Century of Progress exposition, the interesting column "Along the Line"—chuck-full of humor and philosophy, a poem, a picture of the new airship Macon, and a story on the telephone equipment it carried, notes on a call to Mexico City, an article on daylight saving time, and many other interesting and instructive features.

One of the most popular features ever carried was a convenient score-card for the new contract bridge rules. Hundreds of extra copies of this issue were given away.

Since 1910 . . . under all conditions . . . our salesmen have been selling Telephone Directory Advertising . . . Millions of interviews with telephone subscribers have taught us something about selling Telephone Directory Advertising and building up Public Relations . . . We find that this experience is more valuable . . . more necessary . . . today than ever before . . . If we are not selling your directory advertising call or write for our proposition . . .

L. M. BERRY & CO.

MAIN OFFICE: Telephone Building, DAYTON, OHIO
Telephones: Long Distance Loop 16, or ADams 4127

Philadelphia, Rochester, Tampa, Bristol, LaCrosse

Crapo GALVANIZED PRODUCTS

Steel Strand
• • •
Telephone Wire

ECONOMIZE with safety by using *Crapo* Galvanized Steel Strand and Wire on all new and replacement jobs.

The heavy, pure zinc coating, thoroughly bonded to the wire, resists corrosion, increases durability and substantially lowers maintenance costs.

Be sure to specify genuine *Crapo* Galvanized Products! Representative Jobbers in all principal jobbing centers are ready to supply you on instant notice.

Indiana Steel & Wire Company
Muncie, Ind.

NEWS FROM THE FIELD

The Northern Ohio Telephone company, the largest Independent concern of its kind in the state, is giving its employes a vacation of one week with full pay this year. It has 42 exchanges, chiefly in Ohio.

A building and general improvement program representing an outlay of approximately $50,000 is now under way at Fort Brown, Tex., historic army post, among which is a new telephone system.

The National Telephone company is installing a large number of telephones in the new oil field south of Pearson, Okla., where more than a half dozen locations are drilling and a few new sites are active in erecting rigs and rigging up derricks.

Missouri users of the cradle type telephone will save $90,000 annually when the new Public Service Commission order reducing the charge for the instrument from 25 to 15 cents per month becomes effective on September 1, C. A. Ulffers, an official of the Southwestern Bell Telephone company, said. He said the reduction would be accepted by his company.

After studying comparative telephone rates of cities equal in size and population to Princeton, Ind., the city council has voiced its decision that it would not be made a party to a petition recently submitted to it to put the council's weight behind an effort to secure lower telephone rates from the Princeton Telephone company.

The decision was not unexpected, for when the petition was first brought to the attention of the council, a majority of members, it was authoritatively learned, indicated they were not in favor of it. The decision was made on the basis that the rate offered subscribers was equal to and lower than most cities of Princeton's population.

W. B. Gregson, associated with New Philadelphia (Ohio) Telephone companies for 32 years and more recently division commercial manager with The Ohio Associated Telephone company, recently announced he was no longer associated with the company.

Mr. Gregson started his public utility career with The Tuscarawas County Telephone company, of which he was vice president and manager from 1913 to 1925 when it was taken over by The Ohio Cities Telephone company, which firm he served as treasurer and general manager.

Fenner, Beans & Ungerleider, stock brokers of Zanesville, Ohio, have completed a direct telephone connection with Newark and all telephones there.

The service facilitates the transmission of business with customers in Licking county seat and is one of several comparatively recent improvements in the office.

For the third successive year, the record for safe driving of the huge fleet of motor vehicles operated by the New Jersey Bell Telephone company, was substantially improved in 1932.

Through the concerted effort of approximately 2,000 company drivers who voluntarily signed safe driving pledges at the start of the year, the number of automobile accidents for which these drivers were in any way responsible reduced by 29 per cent as compared to the record for 1931. The decrease over the record for the year 1929 amounted to 65 per cent, reports the New Jersey Public Utility information committee.

Manager Don Newell, of the Northwestern Bell Telephone company, expects that the contract for the new telephone building in Spirit Lake, Ia., will be let soon. Plans have been sent to the various bidders in the community, and upon their return, the contract will be let and work started immediately on the new building.

A recent storm in Nicollet county, Minnesota, caused considerable damage to telephone equipment. It was reported that along the stretch of line between St. Peter and Nicollet many poles tipped over.

Illinois Bell Telephone company subscribers who prefer the cradle type telephone and who have paid the 25 cents monthly surcharge for that type of instrument for three years will be relieved of the extra charge through an order recently entered by the Illinois Commerce commission.

The Northern Kentucky Telephone company, of Bracken county, Kentucky, carried to the United States Circuit Court of Appeals its suit for $1,050,000 damages from three telephone companies.

The company appealed from the decree of Federal Judge A. M. J. Cochran dismissing its suit under the Southern Bell Telephone and Telegraph company, Louisville, the Cincinnati and Southern Bell Telephone company and the Citizens Telephone company of Cincinnati.

The three companies are accused of acting in restraint of trade by refusing to extend long distance service to the plaintiff's subscribers in Bracken and Robertson counties, Kentucky.

Meeting with a committee of business men, recently, J. M. Shea, representative of the Iowa Union Telephone company, Osage, Ia., countered requests for a lower phone rate on St. Ansgar rural lines with a proposal that the farmers buy the lines from the company and pay for the switchboard service at the rate of six dollars a year per subscriber.

An estimate of the selling price of the lines will be presented later. The actual price would be determined by a survey made by a disinterested engineer. At a previous meeting Mr. Shea roughly estimated the valuation of the thirty-five lines at $20,000.

The South Dakota board of railroad commissioners has issued an order requiring the Northwestern Bell Telephone company to discontinue after next Oct. 1 its charge of 25 cents a month additional for "hand sets" which have been in continuous use for three years.

The Wisconsin senate has approved a bill to permit cooperative telephone associations made up of farmers to set up their own telephone systems without a grant of authority from the public service commission.

The measure would restrict the establishment of such local systems outside a radius of three miles of existing exchanges, except if permission is granted by the public service commission.

Such local systems would be owned and used entirely by the farmers belonging to associations.

How often does a telephone get out of order?

That's a question that would get a lot of different answers during the daily round of an inquiring reporter. And the only way to get one answer that is correct is to strike an average.

Such an average has been figured out by the New Jersey Bell Telephone company for all telephones in service in the state. It shows that a subscriber's telephone got out of order about once every 19 months during the year 1930. That was an improvement over 1929 when the average was once every seventeen months.

BANKER WANTS 7½% PHONE RETURN

The Wisconsin Telephone company should be permitted to earn a return of 7½ per cent on the fair value of its property, Robert W. Baird, vice-president of the First Wisconsin National bank, Milwaukee, testified recently at the telephone rate hearing before the public service commission.

Mr. Baird pointed out that the company is not allowed to earn more than a certain amount, but that there is no limit by the public service commission on how low its earnings can go. As a result of this situation, he said, and of the further fact that the company is not immune to the effects of the depression, its securities have little speculative appeal.

It was testified by Mr. Baird that he had made an investigation of the rates at which 12 corporations suitable for comparison with the telephone company have borrowed money on first mortgage bonds. He said that the rates varied from 6.8 to 10.5 per cent.

This testimony was designed as an answer to the contention of the commission that the dividend rate on the common stock of the Wisconsin Telephone company was excessive. This rate was 8 per cent until a few months ago, when it was cut to 6 per cent. The company finances itself by the sale of this stock to the American Telephone and Telegraph company.

The effect of the testimony was that if the 12 comparable corporations have to pay as high as 10.5 per cent to finance themselves, even though they give first mortgage bonds as security, the telephone company is not paying an excessive rate for its financing.

EDITOR FOR POSTAL TELEGRAPH

Postal Telegraph service in connection with telephone service has proven very popular in Toledo, Ia., according to Editor C. M. Richards of the Toledo Chronicle, who wrote to the Herald-Ledger of Eldora, Ia., as follows:

"I note by your paper that on June 1 the Central Iowa Telephone company, co-operating with the Postal Telegraph company, will open a postal telegraph office in Eldora, and I am certain that you will be pleased with this service.

"Since the installation of this service in Toledo in November 1931 we have had twenty-four hour service, while previous to that time we were entirely without night service except as it was telephoned from distant stations.

"I believe that Toledo people generally will agree that service from both the Postal Telegraph and Western Union has been a valuable acquisition."

SAVE 10 CENTS

on a pound of solder by accepting an inferior grade in place on Kester Solder.

SPEND 10 DOLLARS

locating the trouble caused by the poor quality solder months later. Demand Kester—avoid disappointment. Write for free booklet and free sample. KESTER SOLDER CO., 4210 Wrightwood Ave., Chicago, Illinois; Newark, N. J.; or Brantford, Ont., Canada.

W. L. Runzel, President, brings to this organization 41 years' experience in the manufacture of this type of telephone equipment

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May we quote you on your requirements?

RUNZEL CORD AND WIRE CO.

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The Home of the Perfect Cord

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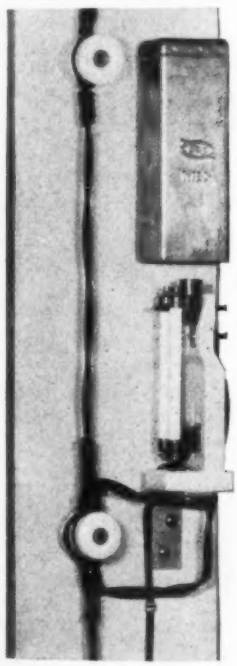

STATION PROTECTOR

TYPE O-7

Mounted outdoors it keeps high potential out of subscriber's premises.

Adequate protection at low first cost and low maintenance cost.

Always accessible when mounted outdoors.

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COOK ELECTRIC COMPANY

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Stay at the Morrison when you visit the Chicago World's Fair of 1933. The Morrison Hotel is an outstanding example of the progress of invention and industry displayed in A Century of Progress.

In the Heart of the Loop

Quick, Friendly Service

Large, Inviting Rooms

Fine Garage Facilities

Only $2.50 up with Bath

MORRISON HOTEL

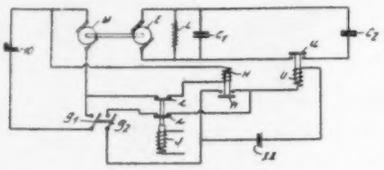
CHICAGO

LATEST TELEPHONE PATENTS

By BEN J. CHROMY
Patent Attorney
Washington, D. C.

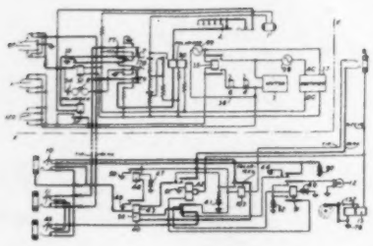
Mr. Chromy will gladly answer any questions relating to patents submitted to TELEPHONE ENGINEER.

1,904,517. DUPLEX SYSTEM OF TELEPHONY. Hans Paesler, Berlin, Germany, assignor to Telefunken Gesellschaft für Drahtlose Telegraphie m. b. H., Berlin, Germany, a Corporation of Germany. Filed Feb. 8, 1927, Serial No. 166,671, and in Germany Feb. 26, 1926. 4 Claims. (Cl. 179—15.)



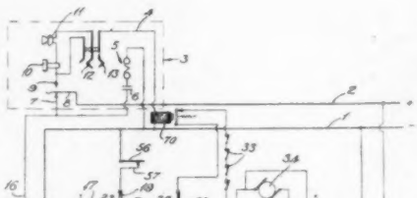
1. In radio frequency communication systems including an oscillation generator having a frequency determining circuit and means for changing the tune of said circuit, switching means for putting said oscillation generator into operation, means associated with said switching means and with the frequency determining means in the cricuit of said oscillation generator for insuring that the change in the tune of said circuit is completed before said generator develops oscillations in said circuit of appreciable amplitude, and means for preventing change in said frequency determining circuit from being made when said generator is stopped until said generator stops producing oscillations in said circuit.

1,904,278. MESSAGE REGISTER CIRCUIT FOR TELEGRAPH EXCHANGES. Allan B. Dickinson, Brooklyn, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a Corporation of New York. Filed Jan. 27, 1932. Serial No. 589,196. 16 Claims. (Cl. 178—2.)



1. A telegraph exchange system comprising a central office and a plurality of subscribers' telegraph printer stations any two of which stations may be connected through said central office as desired, and including means, under control of the central office attendant, whereby apparatus at an unattended subscriber's station may be set into operation in order to record a message transmitted through said central office by a second subscriber, characterized in this, that means individual to said second subscriber's station are provided for registering each connection completed from his station to an unattended station.

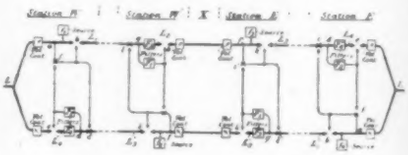
1,904,298. DEVICE FOR TRANSMITTING AND RECORDING TELEPHONE MESSAGES. Kenneth Hartley Sayre, New York, N. Y., assignor of forty-five per cent to John C. Thorne, New York, N. Y. Filed May 21, 1931. Serial No. 539,081. 20 Claims. (Cl. 179—6.)



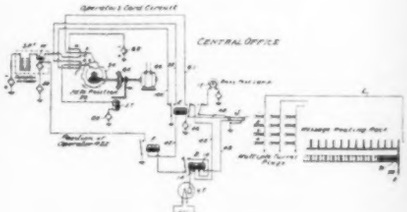
1. In a device of the character described, an arrangement of conductors leading from a central station, a normally open telephone transmitter and receiver circuit, adapted to be manually closed, a telephone ringing device circuit, and an auxiliary recorder circuit, said three circuits being connected to said conductors at all times, said ringing circuit and said auxiliary circuit being energized substantially simultaneously and automatic means to delay operation of said auxiliary recorder for a substantial period after said energization.

1,903,888. TWO-WAY TELEPHONE SYSTEM. Sumner B. Wright, South Orange, and Doren Mitchell, Marinsville, N. J., assignors to American Telephone and Telegraph Company, a Corporation of New York. Filed June 13, 1931. Serial No. 544,194. 11 Claims. (Cl. 178—44.)

1. In a system for the transmission of energy, including a mutable transmission path and other transmission paths connected in tandem therewith, the method of controlling transmission over the system which consists in causing the energy transmitted thereover for the production of the desired overall effect to apply control energy to the transmitting end of the mutable path, causing the control energy to control the transmission over the receiving end of said path, and excluding the control energy so applied from the system beyond the point where it performs the above-stated function.



1,904,578. ATTACHMENT FOR TELEPHONES. Frank Edward Vanderhoof, Greenwich, Conn. Filed May 7, 1931. Serial No. 535,727. 1 Claim. (Cl. 24—19.)



An attaching clamp for telephones of the upwardly tapering base type comprising a tranversely split ring, adjustable fastening means between the ends of the ring, whereby the ring can be clamped to the base, said ring being provided at its upper edge portion with inwardly and upwardly extending portions defining projections for engaging against a reduced portion of the said base and at its lower edge with inwardly disposed lugs for engaging the bottom of the base.

F. W. Kennedy, who has been manager of the Pocahontas (Ia.) Telephone office for the past three and one-half years, has been transferred to Des Moines to the central office. Kennedy came to Pocahontas in 1929 from Monticello. He has been succeeded by Robert Hurd of Waterloo.

For every cutting job the answer is *Vacuum Grip*

REG. U.S. PAT. OFF.

FOR over twelve years the name Vacuum Grip has been a by-word for cutting ability, among telephone electricians and linemen. The Vacuum Grip line covers every cutting job in the telephone field, from the smallest silk insulated wire up to the heaviest cables and bolts.

The cutting edges of the Special Switchboard Diagonals are so accurately matched that they make a **clean cut through the insulation of the finest wire**, as well as the wire itself.

For ease in handling the tough cutting jobs, Vacuum Grip Heavy Duty Diagonals are absolutely, in a class by themselves.

All Vacuum Grip Diagonals are made with hand-filed cutters, strong, easy-riding joints and spring-tempered handles. They are hammer-forged from our own formula of electric furnace high carbon alloy tool steel—individually hardened **thru and thru—not surfaced-hardened!** They outlast ordinary diagonals eight and ten to one!

No. 186—Special Electricians and Switchboard pattern for fine cutting. Length 6". Price $1.90. No. 185—Length 5". Price $1.75.
No. 86—Standard Heavy Duty. Length 6". Price $2.00. No. 85—Length 5". Price $1.65.
No. 87—Special Heavy Duty. Extra heat treated for the toughest cutting jobs. Length 7". Price $2.50.

VACUUM GRIP BOLT CUTTERS

The most powerful Bolt Cutters made, and the only Bolt Cutters with blades of finest electric furnace Molybdenum alloy tool steel and handles of tool steel instead of easily broken cast steel. Blades assembled for quick removal and replacement, as a single unit. No adjustment nuts.

No. 114—Telephone Lineman's Special—Cutting capacity 5/16"—equal to any 18" cutter on the market. Length 14". With side-cut blades, $4.00. With centre-cut blades, $4.25.

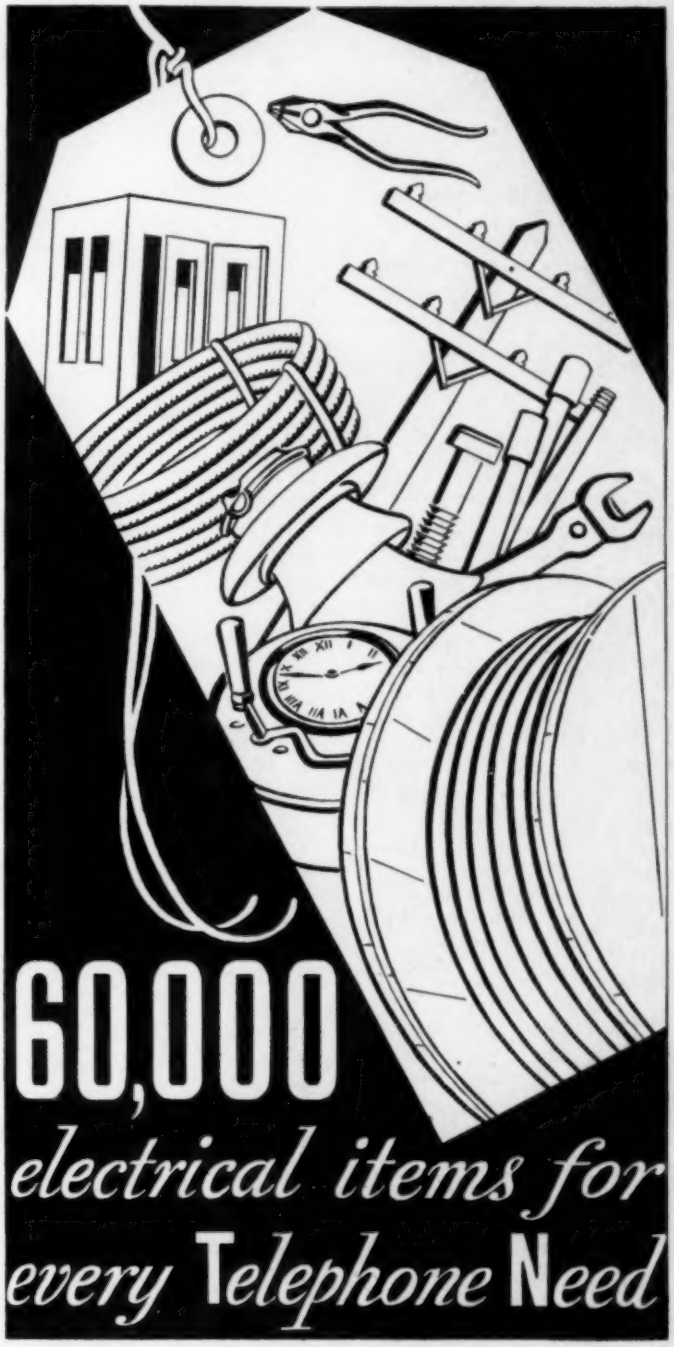
Also in 18" and 24" sizes. All sizes may be had with side-cut, end-cut, diagonal-cut or centre-cut blades.

PURCHASING AGENTS desiring to make running tests can get trade prices on orders of one-half dozen or more (sets or broken lots). Write to us direct—TODAY.

Company or lineman's name etched on handle of every Vacuum Grip Diagonal Cutter or Bolt Cutter, FREE.

FORGED STEEL PRODUCTS COMPANY
Newport, Pa.

OVER ONE MILLION VACUUM GRIP PLIERS IN USE!



In these days when everyone is looking for purchasing economies, Graybar's service of supplies makes economies possible . . . It brings 60,000 electrical items within arm's reach of the telephone user. Does away with "shopping" around. Eliminates expensive stocks . . . The natural result of Graybar's long experience in meeting the special needs of the telephone industry—an experience that goes back to the beginnings of that industry in America.

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OFFICES IN 75 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BLDG., N.Y.

NEWS OF FOREIGN COUNTRIES

EGYPT TELEGRAPHY SCHOOL

The Egyptian State Railways, according to press reports, plan to open in the near future a school of telegraphy and traffic control. Candidates to take the course number 720, but of these 109 have been refused as too old, and 71 for not fulfilling the conditions laid down.

INTERNATIONAL EXCHANGE

Faraday Building, the new Post Office international telephone exchange, described as the finest in the world, was opened May 4. All of the 200 operators speak two languages, French and German, in addition to their own, and many of them also speak Spanish and Italian.

TURKEY REPORT

The activities of the Turkish Bureau of Posts and Telegraphs during 1929 and 1930 are indicated in the following table:

	1929	1930
Number of post and telegraph offices	810	806
Population to each office	16,849	16,933
Length of telegraph lines, kilometers	28,510	28,510
Length of cable lines, kilometers	550	550
*Pieces of mail handled thousands	130,664	102,837
Number of telegrams and cables handled, thou...	16,032	13,716
Receipts, 1000 Turkish Pounds	5,982	5,378
Expenditures, 1000 Turkish Pounds	5,550	5,016

(*) Includes letters, parcel posts, money orders, etc.

Ankara, Istanbul and Izmir are the only cities in Turkey which have modern public telephone systems. The number of telephone subscribers in these cities increased from 15,879 in 1930 to 16,155 in 1931, while the number of conversations declined from 18,330,000 to 18,050,000. Long distance telephone service is available between Istanbul and Ankara, and a few other Turkish towns, and between Istanbul and Ankara and most of the important centers in Europe.

BELGIUM TO GREECE

Telephone connections have recently been opened between Belgium and the Salonica region in Greece. A royal decree of March 30, 1933, fixes the cost of communications with Greece at 100.10 francs (par value of Belgian franc $0.0278) per unit of three minutes. A reduction of 40 per cent is accorded on communications between the hours of 7 p. m. and 8 a. m.

EGYPT TELEPHONE REVENUE

The revenue of the Egyptian Telephone Department for the period January 1 to March 31, 1933, is L. E. 537,000 against L. E. 460,000 for the same period last year, and the revenue of the Telegraph Department was L. E. 147,000 as against L. E. 162,000 for the previous period. (Egyyptian pound equals $3.55.)

TELEGRAMS FROM AEROPLANES

Beginning April 1, 1933, telegrams may be sent from aeroplanes to all European countries. Up to that time, telegrams were accepted only for delivery in Czechoslovakia, Austria, Hungary and Germany. The text may not be in code and must not be, including the address, longer than 15 words.

CHINA PHONE STATISTICS

	1931
Postal Service—	
Number of Offices	12,523
Pieces of Mail (thousands)	796,018
Gross Receipts (thousands Ch. $)	39,771
Equivalent (thousands US $)	8,925
Telegraphs—	
Length of line (miles)	63,718
Length of wire	107,186
Messages sent (thousands)	3,522
Telephones—	
Length of wire (miles)	423,600
Number of Instruments (estimated figure only)	155,000

SWEDEN TO TURKEY

Telephone service was opened between Swedish stations and Angora and Istanbul, Turkey, on February 25. The rate for a three minute conversation between 8 a. m. and 7 p. m. is 21.20 kroner, and between 7 p. m. and 8 a. m. 12.90 kroner. (Present rate 5.50 kroner to the dollar.)

WIRELESS STATION INSTALLED

To keep pace with modern banking and finance requirements, the Minister of Finance has, by special arrangement with the Ministry of Communications, started erecting a shortwave wireless station on the top floor of the Central Bank. Masts have already been erected on the roof of this Government banking institution but the necessary aerials have yet to be installed. When completed, the new station will establish direct communication with Nanking and Hankow, but not as far as Peking.

LATVIA TELEPHONES

Postal Service—	1932
Number of Offices	1,430
Pieces of Mail	79,401,816
Gross Receipts (Lats)	7,094,592
Telegraphs—	
Length of Line, kilometers	3,315
Length of Wire, kilometers	38,738
Messages Sent	1,324,761
Gross Receipts (Lats)	1,099,309
Telephones—	
Length of Wire, kilometers	332,434
Number of Subscribers	52,509
Gross Receipts (Lats)	7,889,054

(Par value Lat $0.193)

WIRELESS FOR AIR-TAXIS

The first air-taxi operated by Airwork, Ltd., from Barton Moss is to be equipped with a new type of Marconi lightweight apparatus, which will enable the pilot to keep in touch with the new wireless station at the airport, or with other ground stations in Great Britain and the Continent when long-distance flights are undertaken. The equipment incorporates a transmitter and receiver in a single instrument box of small dimensions, and derives its power from a wind-driven generator mounted in the slipstream from the propeller of the aircraft. The same generator can be used, if required, to supply current for the general lighting of the machine. Little tuning is required, and the apparatus can therefore be installed in any convenient part of the aircraft and operated from the pilot's cockpit by means of remote control.

NEW CHIME SIGNALS FOR PHONE USE

American Automatic Electric Sales company has recently announced the development of a new type of telephone signal, known commercially as the Mell-O-Tone Telephone Chimes. These new signals, while fully as reliable as the ordinary polarized ringer, offer the

Mell-O-Tone Telephone Chime, Model TE

distinction of being much more pleasing and appropriate in tone. At the same time they are sufficiently arresting to be heard distinctly within a normal range.

It has long been the opinion of a large group of telephone people that there are numbers of places where the ordinary telephone bell is anything but perfectly suited to its location. This is particularly true in certain types of homes or private offices where among otherwise appropriate surroundings, a telephone bell may strike an unnecessarily harsh or discordant note.

Mell-O-Tone Telephone Chimes are being offered to telephone companies for rental to telephone users in homes, offices or other locations where a more pleasing signal than the ordinary telephone ringer may be desired. It is expected that they will have a wide appeal to a substantial group of telephone users and should provide a generous source of additional revenue for progressive telephone companies.

The Mell-O-Tone telephone chime is modeled after the Mell-O-Tone door chime, which is being widely used as an improved type of door signal. As adapted for telephone use, the chime strikes a single musical note which is repeated at the beginning of each ringing period. This musical note is caused by a plunger which moves in a solenoid and strikes a chime bar behind a cylindrical resonator.

The solenoid coil is energized from a local low voltage circuit of approximately 20 volts, supplied by either a step-down transformer or a set of dry cells. The circuit is closed at each

Mell-O-Tone Telephone Chime, Model TR

ringing period by an alternating current relay operated by the regular ringing current from the telephone central office. The chimes are available in the combinations described hereunder.

Model TR consists of a standard steel ringer case, on the front cover of which is mounted the chime with its resonator and solenoid. The base of the box contains the alternating current relay, condenser, and the terminal strip, but of course, no ringer.

Model TE consists of the chime mechanism only, mounted on an attractive bakelite base. This requires the use of a relay mounted separately, which is available together with a condenser in a neat bakelite box. This relay and condenser can be connected across the main telephone line in any suitable location.

Model TD consists of two separate chimes mounted on an attractive bakelite base, the second chime being used either as a door signal or as a signal for a second telephone line. Both chimes operate from the same low voltage circuit and each chime requires a separate relay of the type previously mentioned.

The Mell-O-Tone telephone chimes are suitable for use on all types of telephone lines, except harmonic party lines and lines using "long and short ring" codes.

TELEPHONE OFFICIAL DIES

Shirley T. VanCleave, auditor and assistant secretary of the Citizens Independent Telephone company of Terre Haute, Ind., and of the Wabash Telephone company of Bloomington, Ill., for the past 20 years, died at his home at 8:45 Sunday morning, June 11, 1933, after an illness of three months. He has been a resident of Terre Haute for the past 30 years.

He was born in the rural district of Knox County on August 21, 1876, and spent his boyhood days and early youth attending the Knox County schools. He later attended the Indiana State Normal School at Terre Haute and in 1896 was married to Hallie Walker.

YOU are cordially invited to visit us in Room 2512, Stevens Hotel, during the National Telephone Convention, July 11-12-13-14.

CORDS, CABLES & WIRES

Lenz Electric Mfg. Co.

(Formerly Runzel-Lenz Electric Mfg. Co.)

1751-7 N. Western Ave. Chicago

NEWS OF MANUFACTURERS

RAWLPLUG EXHIBIT AT FAIR

Visitors to the Industrial Engineering Section in the General Exhibition Building in the Century of Progress Exposition, Chicago, have found an interesting exhibit by The Rawlplug Company, Inc., New York City.

The display features the firm's complete line, including Rawlplug Fibre Screw Anchors; three-point Rawl-drills for masonry; Rawl Anchors, the new aluminum and lead bolt anchors; and Crowners and Lok-Crowners for sealing and concealing bolt and screw heads and nuts.

Samples of the various sizes and types of each time are attractively mounted on large display panels, together with illustrations of their use.

NEW LEICH HANDSET POPULAR

The new No. 60 Leich Handset Telephone has had a popular acceptance, according to a report from the Leich Electric company of Genoa, Ill.

The new handset telephone uses a booster type anti-side tone induction coil circuit which avoids disagreeable receiver side tone on outgoing transmission, but does not decrease the booster effect. The transmission of this telephone is the same in efficiency as the desk or wall types which use the same circuit, it is said.

The hand unit and handset stand are of black bakelite. The hand unit is well balanced, easy to use and of proper design to fit the cradle of the stand perfectly which results in positive actuation of the hookswitch. The stand, although modern in design, is correct in artistry, pleasing in appearance and will harmonize with all surroundings. The base is 5¾ inches by 4⅜ inches and the height overall is 4 inches. It has a leather covered bottom to prevent marring and scratching.

The hookswitch is an integral part of the cradle at the top of the handset stand. It is attached to the stand by two machine screws and is readily accessible by removing these screws.

HANDSET CONVERSION FOR WALL PHONES

In deference to the growing popularity of the modern handset type of wall telephone, American Automatic Electric Sales company has announced the perfection of plans whereby the conventional wall type telephones (Type 21), manufactured by Automatic Electric company and American Electric company, can be quickly and easily converted to the handset style, using the standard Monophone handset, at a very moderate cost.

The wall type telephone has always been a desirable telephone from many

Type 21 Automatic Wall Telephone Converted to Handset Type

standpoints, and has been particularly favored by many telephone companies and users. It occupies small space, is not easily damaged, and is particularly suited for use in halls, corridors, workshops and similar places where desk or table space may be at a premium. It has, however, been open to the objection that users frequently experience difficulty in maintaining a proper talking position with relation to the transmitter. The use of the Monophone hand unit in place of the conventional receiver and transmitter removes this objection, thus improving both the quality of transmission and the user's comfort and convenience.

The accompanying illustration shows a standard Type 21 automatic wall telephone, converted to the handset type. The manual telephone of the same series as well as the "blanked for dial" telephone can, of course, be similarly converted.

Only three new parts are necessary to make a conversion; a cover to replace the transmitter plate, a new switchhook to replace the existing hook, and a Monophone hand unit to replace the existing receiver and transmitter. The change is a simple one to make, no tools other than a screwdriver being necessary, and circuits with explanatory notes being furnished with each shipment of parts.

INSTALLS KELLOGG BOARD

A new Kellogg 150-line magneto switchboard was recently shipped to the Dillsburg exchange of the York Telephone and Telegraph company of York, Pa. The new equipment is replacing another Kellogg switchboard that has been serving the territory for 25 years. With this new equipment, Dillsburg subscribers will be assured efficient magneto service.

Dillsburg has a population of about 1,000 and is the center of a rich farming community. It is one of the 14 exchanges operated by the 38-year old York Telephone and Telegraph company. In all, this company serves about 15,000 subscribers through its various exchanges.

Mr. George B. Rudy is president of the company and Mr. George B. Rudy, Jr., is treasurer and general manager.

RECTOX BATTERY CHARGERS

The Westinghouse Rectox Battery Charger is completely described and illustrated in a recent four page publication issued by the Westinghouse Electric and Manufacturing company. The construction, application, and operation of the charger are explained in the leaflet pointing out the distinctive features and advantages of this type of dry, non-chemical, metallic oxide rectifier. Copies of the leaflet may be obtained from the nearest district office or direct from the advertising department at East Pittsburgh, Pa.

KELLOGG HOLDS GOLF TOURNAMENT

Kellogg Switchboard and Supply company held its Third Annual Golf Tournament at the Columbian Country Club Chicago, June 17.

The Kellogg Officers' Trophy was won by President G. A. Yanochowski, who came in with a 68, to win the low net prize. Second low net prize went to C. B. Camp. R. Young won first men's low gross, and Miss Georgiana Bosh won the women's first low gross. A dozen coveted prizes were won by the most deserving players.

Fifty Kellogg employees participated in this event, including five members of the fair sex. Practically every department of the company was represented

Where-to-Buy Section

For the convenience of readers of Telephone Engineer

Accounting Systems

COFFEY SYSTEM & AUDIT CO.
Exclusive telephone accounting since 1907.
Certified Public Accountants.
We install the well-known
COFFEY SYSTEM
Audits—Rate Cases and Special Work.
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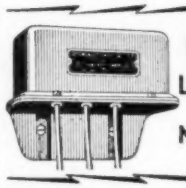

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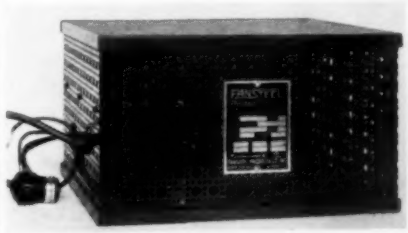
The Fansteel Products company, Inc., North Chicago, has announced its new Type G full wave battery charger with a maximum capacity of one-half ampere to 11 cells of battery.

It may be used for float charging batteries in P.B.X., toll, central office, en-



New Rectifier placed on market by Fansteel Products Company.

ter-communication, recorder, alarm, signal, instrument time clock, circuit breaker and control systems.

Fansteel rectifiers deliver a taper-charge, which in most applications will regulate the charge in proportion to the battery voltage and load demand. The charge increases with a drop in battery voltage and tapers off to the original

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(Original packing cases)
(each) $2.00

Buckeye Telephone & Supply Company
COLUMBUS, OHIO

FANSTEEL MARKETS NEW RECTIFIER

(*Continued from page 37*)

setting as the battery again becomes charged, it is said.

It is claimed that more uniform battery voltage and charge is maintained by a taper-charge rectifier, which in addition to providing ideal operating conditions, prolongs battery life.

LINE & DESK: QUESTIONS AND ANSWERS

(*Continued from page 28*)

mixed in a proportion to give the specific gravity desired. Thus, to obtain electrolytye of 1.210 gravity, the proportion would be about one volume of concentrated sulphuric acid to about four volumes of water. In a fully charged battery all the acid is in the electrolyte and the specific gravity is at maximum. As the battery discharges, the acid separates from the electrolyte which is in the pores of the plates forming a chemical combination with the active material, changing it to lead sulphate. As the discharge continues additional acid is drawn or diffused from the electrolyte into the pores of the plates and further sulphate is formed and it can be readily understood that as this process continues the specific gravity of the electrolyte will gradually decrease, because the proportion of acid is decreasing. On charge the reverse action takes place; the acid in the sulphated active material being driven out of the plates back into the electrolyte. This return of the acid to the electrolyte increases the specific gravity, so that it will continue to rise until all the acid is driven out of the plates back into the electrolyte. After all the acid is driven back into the electrolyte further charging will not raise the gravity any higher, as all the acid in the cells is in the electrolyte and the battery is said to be fully charged. The material of the positives is again lead peroxide and of the negatives spongy lead and the specific gravity a maximum. Practically speaking, on discharge the plates absorb acid and on charge any return the acid absorbed to the electrolyte.

NAMES REPRESENTATIVE

The MacGillis and Gibbs company, manufacturers of White Cedar posts, posts, poles and ties and of Western Red Cedar poles, has announced the appointment of A. A. Marrs as its southern representative, with offices in the Dwight Building, Kansas City.